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THESIS

**ANALYSIS OF THE EFFECTIVENESS OF THE RETIRE
TOOL WHEN DECIDING BETWEEN HIGH-36
RETIREMENT AND BLENDED TSP RETIREMENT**

by

Nathan D. Gilreath

December 2016

Thesis Advisor:
Co-Advisor:

Juanita M. Rendon
Steven P. Landry

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RETIREMENT**

Nathan D. Gilreath
Captain, United States Marine Corps
B.S., The University of Arizona, 2010

Submitted in partial fulfillment of the
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December 2016

Approved by: Juanita M. Rendon
Thesis Advisor

Steven P. Landry
Co-Advisor

Don Summers
Academic Associate
Graduate School of Business and Public Policy

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ABSTRACT

The Department of Defense has enacted military retirement reforms that will change the vested pension system into a hybrid pension and matching Thrift Savings Plan contribution called the Blended Retirement System.

The purpose of this research was to evaluate the effectiveness of a previously developed retirement tool (RETIRE Tool) that allows service members to evaluate and compare the net present values (NPV) of the HIGH-36 retirement system (HIGH-36) and the blended Thrift Savings Plan retirement system (BRS) in order to make an informed retirement decision. The effectiveness of the RETIRE Tool was assessed through a before-and-after survey of military personnel at the Naval Postgraduate School. Service members who have less than 12 years of active service by December 31, 2017 can opt into the BRS between January 1, 2018 and December 31, 2018. The RETIRE Tool provides financial value estimates of the old retirement system compared to the new retirement system.

The research findings show evidence that the RETIRE Tool has a positive net effect on the confidence levels of service members given the choice between HIGH-36 and the BRS. Participants were able to identify which methods of financial education would best assist them with the decision between HIGH-36 and the BRS.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFADBD	Armed Forces Active-Duty Base Date
ANOVA	analysis of variance
BRS	Blended Retirement System
DLI	Defense Language Institute
DOD	Department of Defense
IRB	Institutional Review Board
NPS	Naval Postgraduate School
NPV	net present value
PDR	personal discount rate
RETIRE Tool	realistic evaluation of taxes, interest, risk and equity tool
SRB	Scientific Review Board
TIG	time in grade
TIS	time in service
TSP	Thrift Savings Plan
TVM	time value of money
WACC	weighted average cost of capital
YOS	years of service

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I. INTRODUCTION

A. BACKGROUND

Retirement systems exist within private and government organizations throughout the world as a means to provide benefits to employees after they no longer work within the organization. Significant differences exist between these retirement systems; some plans require lengthy periods of employment while other retirement systems offer benefits after shorter periods of employment.

One purpose of retirement systems is to provide employees an incentive to maintain longer periods of employment and to reduce employee turnover (Lewis & Stoycheva, 2016). To further incentivize this desired behavior, some retirement systems require a specified period of employment prior to retirement system vesting (Graham, 1988). Organizations must find a balance between the cost of retirement systems and the value of employee retention. The current retirement system in the Department of Defense (DOD) is called the HIGH-36 system. This retirement system requires that active-duty service members serve a minimum of 20 years to gain retirement benefits (Bradford, 2015).

After December 31, 2017, U.S. service members with less than 12 years of service (YOS) will face a decision between the HIGH-36 military retirement system and the new Blended Retirement System (BRS). All service members with more than 12 YOS as of December 31, 2017, will remain under the HIGH-36 military retirement system. The election period between the two retirement systems will start on January 1, 2018, and will conclude on December 31, 2018. Once a service member selects a retirement system, this election is final and cannot be changed at a later date (DOD, 2016).

Across the DOD, military branches are preparing financial education designed to inform service members of the benefits of the new retirement system (Perdew, 2016). Given the changes to the retirement system, military leadership at all levels face new challenges to ensure service members make an informed financial decision about their retirement. Service members choosing between the two retirement systems face

challenges as they attempt to discern the financial value of the HIGH-36 system and compare it to the new system. The new retirement system is expected to affect military retention and recruitment; however, it is not entirely clear whether this effect will be positive or negative (Enns et al., 1984).

The previous retirement structure was an “all or nothing” plan, and service members who left prior to 20-years of service were ineligible for retirement benefits. The new BRS allows service members to realize retirement benefits by way of government matched Thrift Savings Plan (TSP) contributions up to 5 percent of base pay. The TSP is a “tax-deferred retirement savings and investment plan that offers Federal employees the same type of savings and tax benefits that many private corporations offer their employees under 401(k) plans” (OPM, n.d.). The BRS also includes the traditional pension after 20 YOS at a reduced rate of 2.0 percent of base pay per year of active service while the HIGH-36 retirement system offers 2.5 percent of base pay per year of active service (DOD, 2016). For a service member, the financial benefit of the HIGH-36 retirement system and the new BRS is dependent on a number of variables. These variables include the service member’s current pay grade, entry date into the armed forces, total YOS, expected future pay grade, life expectancy, TSP account selection, and contribution of base pay to the TSP.

The implementation timeline specified by the DOD starts with leadership training that was released in June 2016. For service members deciding between the two retirement systems, the “opt-in” period will occur throughout Calendar Year 2018 (DOD, 2016). If service members do not want to “opt-in” to the BRS, they simply do nothing and remain under the HIGH-36 retirement system. Starting on January 1, 2018, new military entrants will be automatically enrolled in the BRS. On December 31, 2018, the “opt-in” period for current military members will close.

B. RESEARCH PURPOSE

The purpose of this research is to evaluate the effectiveness of a previously developed tool called the Realistic Evaluation of Taxes, Interest, Risk, and Equity Tool (RETIRE Tool), which was developed by the researcher. The RETIRE Tool allows service members to evaluate and compare the net present values (NPVs) of the HIGH-36 retirement system and the Blended TSP retirement system in order to make an informed retirement decision. The effectiveness of the RETIRE Tool will be assessed through a before and after survey of military personnel at the Naval Postgraduate School (NPS). The RETIRE Tool provides financial value estimates of the old retirement system compared to the new retirement system.

C. RESEARCH QUESTIONS

The research questions are as follows:

1. What effect will the use of the RETIRE Tool have on U.S. service members' level of confidence when deciding between the HIGH-36 Retirement system and the Blended TSP Retirement system?
2. Which features of the RETIRE Tool are most influential to service members when deciding between the HIGH-36 Retirement system and the Blended TSP Retirement system?
3. How can service members best be assisted to make informed financial decisions related to their retirement?

D. METHODOLOGY

A sample population consisting of active-duty U.S. military officers at the Naval Postgraduate School (NPS) was chosen to participate in this study. This sample population was chosen to measure the effectiveness of the RETIRE Tool with potential participants who are at varying stages of their military careers. This research study was approved by the Naval Postgraduate School (NPS) Institutional Review Board (IRB).

Participants in the study completed a voluntary and anonymous online survey using LimeSurvey. Upon completing the pre-survey, participants were provided with a brief instruction session on the use of the RETIRE Tool. Participants then returned to computer stations and were given access to the RETIRE Tool. After using the RETIRE

Tool, participants completed a post-survey using LimeSurvey which was also voluntary and anonymous.

E. IMPORTANCE OF RESEARCH

With a decision looming for many service members between two retirement systems, this research serves to provide a customizable evaluation tool that allows service members to consider the financial value of both retirement systems. The importance of this research is the measurement of levels of confidence that service members experience after using the RETIRE Tool. This research has the potential to provide benefits across the DOD. As individual services look to prepare their service members through financial education, the RETIRE Tool has the potential to serve as the critical link between financial education and financial analysis. By focusing on individual evaluative training to educate service members, this research is different from typical military education programs, which rely upon large classroom environments to educate service members on new policies. The investigator of this research shares the following goal congruence with senior leadership within the DOD: allowing service members to make an informed retirement decision which will benefit the individual and the organization (*Empowering and Protecting Servicemembers*, 2011).

F. BENEFITS AND LIMITATIONS

Prior to the development of the RETIRE Tool, NPV calculations comparing the HIGH-36 retirement system and the BRS would be complicated and time consuming. Even with a knowledge of finance, computing the expected value of payments would require knowledge of both retirement systems and the effective rates of return within the TSP. Possibly the greatest potential benefit of this research is that it allows service members to create financial computations which would otherwise be very complicated.

One limitation of this research is its focus on active-duty service members. While the RETIRE Tool can be used by all ranks within the United States Armed Forces, the focus of the tool is towards active-duty service members. The investigator within this research focused on active-duty U.S. military officers in an effort to test the RETIRE Tool.

Another limitation of this research is the handling of Lump Sum payment options. Under BRS, service members can elect to receive 25 percent or 50 percent of their retirement pension as a Lump Sum payment at some future point in their career (DOD 2016). These Lump Sum payments are expected to be discounted based on a pre-determined rate established by the DOD to reflect the time value of money (TVM) of service members. The research investigator within this research study considered these payments outside the scope of this research.

One final limitation of this research is the valuation of the TSP. Suffice it to say that the research investigator in this study does not have the true rate of return of future TSP contributions. As a result, the RETIRE Tool was developed using historical returns of TSP accounts to estimate future financial value of the TSP.

G. ORGANIZATION OF REPORT

This report consists of five chapters. The introductory chapter is followed by a literature review exploring the current environment. Factors within the current environment include the population affected, the anticipated implementation including the expansion of financial training, and the provisions of default contributions into the TSP. During the literature review, the previously developed RETIRE Tool is discussed in greater detail including the cash flow analysis, tax impacts, cash flow comparison, volatility analysis, and NPV of payments. Chapter II concludes with a review of the potential investment risks of the TSP by looking at historical returns, volatility, investment options, and the shifting risk of Lifecycle Funds.

The methodology of the research is introduced in Chapter III. The methods of analysis within the RETIRE Tool are presented, and the survey structure and method by which the survey was given to U.S. military officers at NPS are described. Chapter III concludes with a discussion of the data analysis method used in this research.

Chapter IV begins with an analysis of the three sources of data (pre-survey responses, RETIRE Tool results, and the post-survey responses). Analysis of the data is explored further through descriptive and quantitative methods. Data is evaluated using a “before and after” analysis of the pre-surveys and post-surveys to answer the research

questions. In Chapter IV, recommendations are provided based on the descriptive and quantitative data analysis. Chapter IV also includes limitations of the study and the identification of the strongest measures found within the pre-surveys and post-surveys. Based on the responses of the service members, recommendations for financial training are provided. Chapter IV also includes a discussion on the implications of the findings. Chapter IV concludes with analytic evidence in support of the answers to the research questions.

Chapter V consists of a summary of the research study and continues with the conclusions and answers to the three research questions. Chapter V concludes with the recommendations of areas for further study.

H. SUMMARY

Chapter I included background information relevant to the research and an introduction to the variables affecting the financial value of the HIGH-36 retirement system and the BRS. The research purpose and research questions were presented, followed by the methodology of the study. The importance of the research was described, and then the benefits and limitations of the research were provided. The chapter concluded with the organization of the report. The following chapter will provide the literature review.

II. LITERATURE REVIEW

A. INTRODUCTION

This chapter is centered on previous studies and current policy to discern the actions leading to military retirement system changes that service members currently face. These issues are addressed through a review of the current environment, with a focus on the comparison between the HIGH-36 retirement system and the Blended Retirement System (BRS). This chapter includes a discussion on the population that is affected compared to those service members who are grandfathered into the old system. This chapter also introduces the expected implementation of the new retirement system, including the implications of expanding financial literacy throughout the Department of Defense (DOD) and the default contribution structure for service members who elect the Blended Retirement System (BRS).

Furthermore, this chapter introduces the financial elements built into the Realistic Evaluation of Taxes, Interest, Risk, and Equity Tool (RETIRE Tool). These financial elements include cash flow analysis, tax impacts, cash flow comparison, volatility analysis, and net present value (NPV) of payments. This chapter concludes with a review of investment risk of the Thrift Savings Plan (TSP). This section explores the historical returns of the TSP, TSP volatility, investment options provided to service members, and the conservative shift of investments over time of Lifecycle funds within the TSP.

B. CURRENT ENVIRONMENT

Retirement benefits in any organization serve as an incentive to workers towards career longevity within the organization (Enns et al., 1984). Specific to the military, the HIGH-36 retirement system is an “all or nothing” system, with retirement vesting occurring after 20 years of service (YOS). With the new BRS retirement system, service members will be offered financial incentives prior to the 20-year mark (DOD, 2016).

On January 29, 2015, the final report on Military Compensation and Retirement Modernization was published by a commissioned board (Bryant, McKinney, LaRue, Cicotte, & Samuels, 2015). The board members and supporting staff consisted of civil

and military leaders, and the board considered feedback from over 100,000 active-duty service members (Bryant et al., 2015). The final report was published with the following three primary goals of the commission:

1. Sustaining an all-volunteer force for the future.
2. Reinforcing recruitment and retention goals and maintaining a high quality of life for service members.
3. Achieving fiscal sustainability within the military retirement system.
(Bryant et al., 2015)

The report offers 15 recommendations, a number of which have been adopted into the current military reform. The following recommendations are the most relevant to this research as many of the other criteria do not deal directly with military retirement:

1. Allow more service members to save for retirement earlier in their career.
2. Promote financial literacy throughout the DOD. (Bryant et al., 2015)

This research is based on the premise that in the current environment, service members do not have adequate financial literacy to effectively choose between the HIGH-36 retirement system and the BRS. In a 2015 study, researchers found that financial literacy creates trust in financial markets. This trust that is created from financial literacy results in a positive correlation between trust and investing participation (Kersting, Marley, & Mellon, 2015). The DOD is addressing the improvement of financial literacy; however, more can be done, given what is at stake for service members.

Multiple sources inside and outside of the DOD cite financial literacy as a necessary competency for service members to make a sound financial decision between HIGH-36 and the BRS. Financial literacy is defined as

the education and understanding of various financial areas. This topic focuses on the ability to manage personal finance matters in an efficient manner, and it includes the knowledge of making appropriate decisions about personal finance such as investing, insurance, real estate, paying for college, budgeting, retirement and tax planning. (“Financial Literacy,” 2016)

The issue of financial literacy in the DOD reached the highest levels of government through a 2011 hearing before the Senate Committee on Banking, Housing, and Urban Affairs (*Empowering and Protecting Servicemembers*, 2011). During this hearing, many senators voiced the need for continued financial literacy throughout the DOD. This point has not been lost on senior military leaders, and new financial literacy training has been developed to meet this objective (Perdew, 2016).

The DOD is working to improve financial literacy through training developed for leaders that introduces BRS for the Uniformed Services (“Leader Training,” n.d.). The web-based training module was designed to prepare military leadership with financial literacy to assist their subordinates with these changes (“Leader Training,” n.d.). Improved financial literacy is accomplished by introducing military leaders to financial definitions applicable to the policy change and the new components of the BRS (Perdew, 2016). Given the complexity of these changes, the expectation is that the DOD will work to improve financial literacy through a series of continuing classes and web-based training (“BRS Education Strategy,” 2016).

The question that arises is: “What resources should service members anticipate will be available to them as they face the decision between the HIGH-36 retirement system and the BRS?” At the time that this research is being conducted, the answer to that question is not perfectly clear since a number of the resources are still in development (“Leader Training,” 2016). The changes to the military retirement system have the potential to affect the financial readiness of service members. Poor financial readiness can lead to lower unit readiness. Navy Region Southwest has studied the issue of financial readiness and has found that “over 80% of clearances are revoked due to financial mismanagement” (Fleet & Family Support Center, 2015).

An online financial calculator will be made available throughout the DOD starting in January 2017. This calculator is being designed to show the financial value of the BRS. In addition to this calculator, the current web-based training module will be expanded to include training for service members who will be eligible to “opt-in” to the BRS (Perdew, 2016). Service members will have access to financial professionals to better understand their unique financial circumstances (“BRS Education Strategy,” 2016).

Finally, it is anticipated that service members will be provided with classroom-type training to provide the necessary training and education across the DOD to eligible individuals (“BRS Education Strategy,” 2016).

1. Pending Retirement Change

The implementation timeline for the BRS has been designed to allow service members an adequate amount of time to learn about the BRS and to make a decision regarding their retirement (“BRS Education Strategy,” 2016). Figure 1 shows the timeline of BRS implementation. The “opt-in” training begins in January 2017, and the “opt-in” period ends on December 31, 2018 (DOD, 2016).

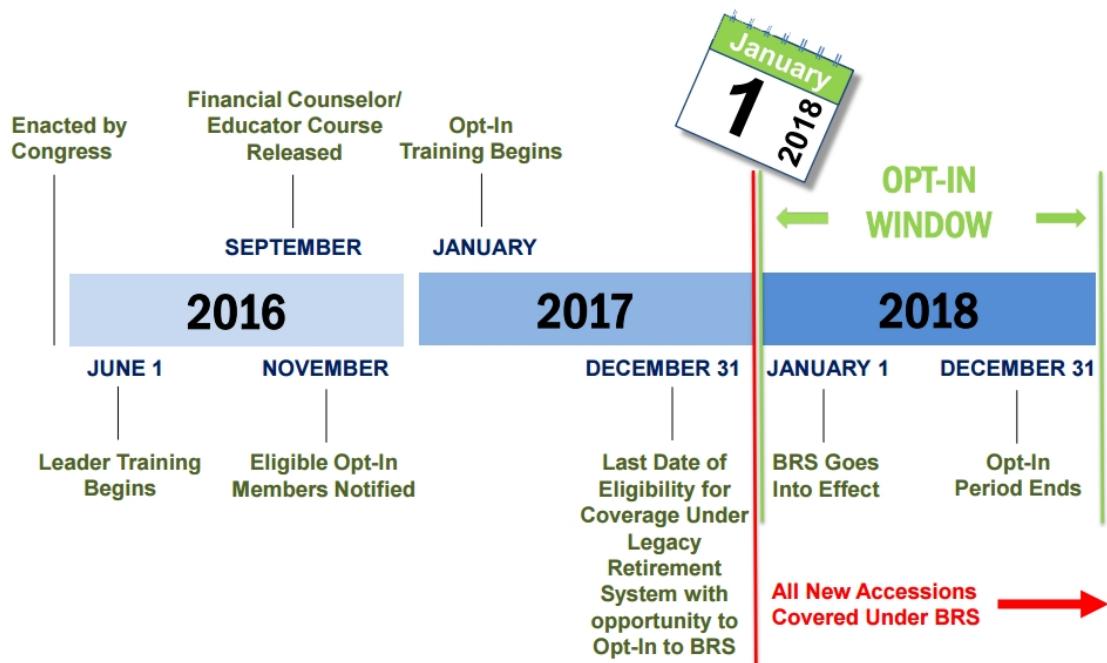


Figure 1. BRS Implementation Timeline. Source: DOD (2016).

Understanding the financial differences between the HIGH-36 retirement system and the BRS is crucial for service members to make an informed financial decision (Perdew, 2016). With this in mind, the following key differences are explored in greater detail:

1. Differences in defined pension benefits between the HIGH-36 retirement system and the BRS
2. The addition of DOD matching contributions of base pay not available in the HIGH-36 retirement system
3. The addition of continuation pay and lump sum options under the BRS

2. Comparison between Old and New Retirement Systems

a. Changes in Defined Pension Benefits

As previously mentioned, defined military pensions benefits under HIGH-36 are accrued only after serving for 20 years or more. Active-duty service members accrue 2.5 percent of their base pay in pension benefits per year of service (Bryant et al., 2015). For example, active-duty service members who served for 20 years on active-duty would be eligible for 50 percent of his or her base pay. The final base pay is calculated by averaging the base pay received during the last 36 months of service (Bryant et al., 2015).

Under the BRS, active-duty service members also become eligible for a retirement pension upon serving for 20 years. Under BRS, the multiple per year of service is reduced from 2.5 percent to 2.0 percent (DOD, 2015). Therefore, active-duty service members enrolled in BRS and who served for 20 years on active-duty would be eligible for 40 percent of his or her base pay as a pension. Figure 2 captures an example of the expected difference in pension benefits between the HIGH-36 retirement system and the BRS. Calculations were estimated using 2016 military pay tables. The example in Figure 2 is an E-8 service member with 22 YOS.



Figure 2. Annual Expected Pension Benefits (Defined Benefit) of an E-8 with 22 YOS

b. Matching Contributions in the BRS

Perhaps the most important feature of the BRS is the DOD TSP matching feature. Providing matching funds to a retirement account is likely to increase overall contribution to an individual's retirement savings. Dworak-Fisher (2011) found that matching funds into retirement accounts results in higher contributions into retirement accounts. The TSP matching feature is also in line with the Military Compensation Commission's recommendation to "allow more service members to save for retirement earlier in their career" (Bryant et al., 2015, p. 23). For members who elect the BRS, the DOD will begin contributing one percent of the service member's base pay into a TSP account (DOD, 2016). Members currently on active-duty who elect BRS will not need to wait the mandated 60 days for these one percent contributions to start. However, no contributions will begin until January 1, 2018. The timing of cash flows in the BRS and the HIGH-36 retirement will have an impact on the nominal, real, and perceived value of the two retirement systems (Goodman, Ashworth, Landry, & Yin, 2016).

Time value of money (TVM) is defined as "the idea that money available at the present time is worth more than the same amount in the future due to its potential earning

capacity” (“Time Value of Money,” n.d.). TVM serves as a financial tool in corporate financial planning, but TVM is a concept that may be unfamiliar to some service members. TVM calculations are dependent on the identification of when future cash flows are to be received. A component of the difference between HIGH-36 and the BRS retirement system is the timing of future cash flows. Given that the cash flows of the HIGH-36 and the BRS occur at different times, NPV is used to allow for comparison between these cash flows.

In addition to the 1 percent automatic contributions, service members under BRS will also be eligible for up to 4 percent additional matching contributions of their base pay to the TSP. Table 1 illustrates the structure of the TSP matching feature.

Table 1. BRS TSP Matching Structure. Source: DOD (2015).

Member Elected Contribution	DOD Contribution	Total Contribution to TSP
0%	1%	1%
1%	2%	3%
2%	3%	4%
3%	4%	7%
4%	4.5%	8.5%
5%	5%	10%

A portion of the financial value of the BRS hinges upon the service member elected contributions to the TSP. Research suggests that the number of investment options impacts the fund allocation of investors when deciding between low risk and high risk investments (Morrin & Broniarczyk, 2008). Whether the number of options available within the TSP will affect a service member’s investment choices is yet to be seen.

The future value of the service member’s TSP will vary within the range of zero contributions up to the maximum matching contribution of five percent. The earliest that service members will be eligible to withdraw from their TSP account is when they reach

the age of 59 ½ (Bryant et al., 2015). The limit on when funds can be withdrawn has TVM implications. The complexity of estimating the financial value of the TSP represents a necessity for focused education throughout the military to ensure service members can make an informed financial decision (Perdew, 2016).

c. Continuation Pay and Lump Sum Options under the BRS

Two additions to the BRS offer new financial incentives to service members facing the choice between the two retirement systems. First, continuation pay is a feature within the BRS that “is provided to Service members at the completion of 12 YOS for those who commit to an additional four years” (“Leader Training,” n.d.). In its current structure, service members will be eligible for a minimum payment of 2.5 months of base pay after 12 YOS in exchange for a commitment of four more YOS (DOD, 2016). This portion of the BRS serves as a financial retention incentive.

Second, the Lump Sum feature within the BRS provides an option for service members to take part of their retirement benefits as a one-time payment. The lump sum, if selected, will reduce future pension payments by either 25 percent or 50 percent (“Leader Training,” n.d.). According to the online training available to military leaders for the BRS, lump sum payments will be discounted using a “personal discount rate” (PDR) based on existing research (Bryant et al., 2015). In theory, this rate of discount, once applied to the reduction of future payments, would leave a service member indifferent between the lump sum payment and the future portion of the pension forfeited (Nord, 1987). Since lump sum payments are elections by the service member, it is at best difficult to determine the likelihood of service members taking these payments. At this time, the policy for Lump Sum payments is still in formulation within the DOD (DOD, 2016). Since the DOD has not yet published the PDR’s that will be used, this research does not address the Lump Sum feature.

3. Population Affected

The modernization of the military retirement system will affect three distinct groups of service members:

1. Service members who have more than 12 years of active service as of December 31, 2017, or more than 4,320 retirement points (for reserve component) (DOD, 2016)
2. Individuals who will join the U.S. military after December 31, 2017 (DOD, 2016)
3. Service members who have less than 12 years of active service as of December 31, 2017, or less than 4,320 retirement points (for reserve component) (DOD, 2016)

These populations are affected in different ways. For service members who will have more than 12 years of active service at the end of 2017 or more than 4,320 retirement points, these service members will remain under the current retirement system (Perdew, 2016). This population is not eligible for the BRS. For the individuals who join the U.S. military after December 31, 2017, these future service members will only be eligible for the BRS (DOD, 2016). They are not eligible for the HIGH-36 retirement system. For those service members who will have less than 12 years of active service at the end of 2017 or less than 4,320 retirement points, these service members may choose between the old retirement system and the BRS (DOD, 2016). For the purposes of this research, the service members who must make this decision represent the population affected. While the other two groups are also affected by the decision, these populations do not have a decision to make; the decision has already been made for them.

4. Expected Implementation

Leading up to the 2018 opt-in period, the DOD will make resources available to service members so that they may make an informed financial decision. Given that the decision service members make is irreversible, special attention should be given to ensuring that members of the United States Armed Forces have the right resources when faced with this retirement decision.

a. Expansion of Financial Literacy throughout the DOD

On the surface, the elements that separate the HIGH-36 retirement system and the BRS may appear to be simplistic and easy to explain. With respect to the difference in pension benefits, this is appearing to be the case. Explaining the differences between a 2.5 percent multiple of base pay compared to a 2.0 percent multiple of base pay is simple and straightforward. What is not as simple is helping service members to understand the financial value of the DOD matching portion of the BRS. This portion of the BRS will possibly be a point of emphasis for DOD leadership as they seek to improve financial literacy throughout the ranks.

b. Default Contribution of the TSP

Provided that service members elect enrollment in the BRS, they will be given a choice of investing in several TSP accounts. They will also be able to elect the percentage of base pay that goes into their TSP. If service members elect the BRS, but do not elect a TSP account or a percentage of base pay, by default they will be enrolled in the TSP Lifecycle Fund closest to their 62nd birthday (“Managing Your Account,” 2015). Without a selected percentage of base pay, by default, service members will contribute 3 percent of their base pay as well. While service members must make the decision between the HIGH-36 retirement system and the BRS now, the management of the TSP goes beyond that decision. Because of this, financial literacy must continue well beyond the “opt-in” period to help service members understand how to continue to manage their retirement savings (Pampuro, 2016).

C. VARIABLES AFFECTING FUTURE VALUE OF THE TSP

The following list represents the variables with the greatest effect on the future value of the TSP retirement account of the service member. Variables were selected based on their ability to financially impact the future value of the TSP. Variables were selected by the researcher. These variables were selected to keep the RETIRE Tool user interface simple while still allowing for detailed calculations.

1. **Current Pay Grade:** Under the BRS, government matched TSP contributions will be tied to the service member's base pay. Officers and enlisted members of varying pay grades will choose between the current and new retirement system, and this results in different contributions for service members.
2. **Birth Date:** Date of birth is an indirect variable which will affect the financial benefit of the two retirement systems. Differing ages of service members with otherwise similar variables will change the length of time that their TSP will grow until retirement. All else being equal, the older a service member is, the less time their TSP has to grow until retirement age.
3. **Date of Active Duty:** The Armed Forces Active-duty Base Date (AFADBD) variable will determine when service members are eligible for traditional pension benefits. The AFADBD will also affect the current pay of service members. As service members reach Time in Service (TIS) milestones, they will receive pay raises as applicable.
4. **Total YOS:** The number of years that service members remain on active-duty will affect the total amount of individual contributions and government matched TSP contributions. Under the BRS, service members will be eligible for matching contributions through their 26th year of service.
5. **Expected Future Pay Grade:** In conjunction with the number of years a service member will remain on active-duty, the expected future pay grade of the service member will affect the financial value of the retirement system. For the HIGH-36 retirement system, future pay grade will determine the total value of the pension payment. For the new retirement system, pension calculations will also be based on pay grade, and TSP contributions will be based on base pay. Service members who attain higher pay grades will have larger contributions to the TSP compared to service members who do not promote as quickly. This is a result of a higher base pay; and therefore, a higher amount being contributed to their TSP.
6. **Life Expectancy:** The length of time that a service member lives after leaving service will affect the value of his or her military retirement benefits. For service members electing the HIGH-36 military retirement system who vested for 20 years or more, the financial value of their program grows as they live longer (by continuing to receive pension payments). For service members electing the BRS, the pension portion of benefits also increases in value, but at a lower rate compared to the HIGH-36 retirement system.

7. **TSP Account Selection:** Service members who choose to contribute to the TSP may choose between six groups of funds (“TSP Fund Comparison Matrix,” n.d.). The first fund is the G Fund, which is a Government Securities Investment Fund (“TSP: G Fund,” n.d.). The second fund is the F Fund, which is a Fixed Income Index Investment Fund (“TSP: F Fund,” n.d.). The third fund is the C Fund, which is a Common Stock Index Investment Fund (“TSP: C Fund,” n.d.). The fourth fund is the S Fund, which is a Small Cap Stock Index Investment Fund (“TSP: S Fund,” n.d.). The fifth fund is the I Fund, which is an International Stock Index Investment Fund (“TSP: I Fund,” n.d.). The sixth group of funds consists of Lifecycle Funds, or L Funds. The Lifecycle Funds consist of a “mix of G, F, C, S and I Funds to a particular time horizon, or target retirement date. The investment mix of each L Fund becomes more conservative as its target date approaches” (“TSP: Lifecycle Funds,” n.d.).

Each TSP fund offers different potential rates of return and differing levels of market risk. The choice between the TSP accounts will affect the financial value of the BRS.

8. **Contribution of Base Pay:** Given that the new BRS offers matching government contributions to the TSP, the service member’s percentage of base pay contribution will affect the financial value of the new retirement system. Upon active service of 60 days, service members enrolled in the BRS will receive DOD Automatic contributions of 1 percent of their base pay (DOD, 2016). Completion of two years of active service results in an additional DOD matching of up to 4 percent of base pay (the 1 percent matching occurs regardless of service member contributions; however, the 4 percent additional matching is dependent upon member contributions).

D. ELEMENTS OF RETIRE TOOL ANALYSIS

The elements that comprise the previously developed RETIRE Tool were selected based on the following question: What financial tools will help service members make an informed financial decision regarding the decision between the HIGH-36 retirement system and the BRS? This question brought about a “user-focused” approach to the RETIRE Tool development. The elements of financial analysis serve to provide different ways to look at the same information. A goal of this research is to measure the effectiveness of these elements through a change in a service member’s level of confidence after using the tool. The following elements are found in the RETIRE Tool:

1. **HIGH-36 Pension Element:** This element of the RETIRE Tool estimates the annual pension benefits that the service member will receive based on the responses to questions in the RETIRE Tool. The HIGH-36 Pension

Element provides an annual estimate and a monthly estimate of pension payments. This section of the RETIRE Tool also provides federal tax estimates based on current tax brackets.

2. BRS Pension Element: This element of the RETIRE Tool provides estimates of the annual pension benefit that service members will receive if they choose the BRS. The BRS Pension Element provides an annual estimate and a monthly estimate of pension payments. This section of the RETIRE Tool also provides federal tax estimates based on current tax brackets.
3. TSP Growth and Annuity Element: This element of the RETIRE Tool provides an estimate of the service members' TSP account when he or she turns 59 ½. This element also provides an estimate of an annual annuity that the service member could withdraw from the TSP based on life expectancy and the TSP account selected. The TSP Growth and Annuity Element also estimates how taxes will increase at the time the service member begins receiving annuity and pension payments.
4. HIGH-36 and BRS Cash Flow Element: This element of the RETIRE Tool provides a comparison of cash flows from the present date until the end of life expectancy of the service member. This element separates these cash flows into three categories: HIGH-36 cash flows, BRS cash flows, and member-elected TSP contributions under the BRS.
5. TSP Growth and Withdrawal Chart: This element of the RETIRE Tool allows service members to see a visual estimate of the growth of their TSP account, and the subsequent decline in account value as service members begins to withdraw an annuity.
6. TSP Volatility Element: Based on the TSP account that the service member selects, the TSP Volatility Element displays the average volatility of that account over time. The purpose of this element is to help the service member better understand the financial risks associated with their TSP account.
7. NPV of HIGH-36 and the BRS: This element of the RETIRE Tool provides the service member with a calculated NPV of the HIGH-36 retirement system and the BRS. The PDR of the service member is applied, with an option for the service member to enter a different rate.
8. Graphical NPV of HIGH-36 and the BRS: This element of the RETIRE Tool provides the service member with a graphical monthly calculated NPV of the HIGH-36 cash flows compared to the cash flows of the BRS. This element shows the service member the NPV of these cash flows based on when they are received over the service member's life.

1. Cash Flow Analysis

Within the RETIRE Tool, service members are provided with a cash flow analysis of the HIGH-36 retirement system and the BRS. This analysis is provided by estimates of future cash flows presented as annual amounts, monthly amounts, and lump sum amounts between the two systems. Figure 3 is a sample output of the HIGH-36 cash flow analysis section of the RETIRE Tool.

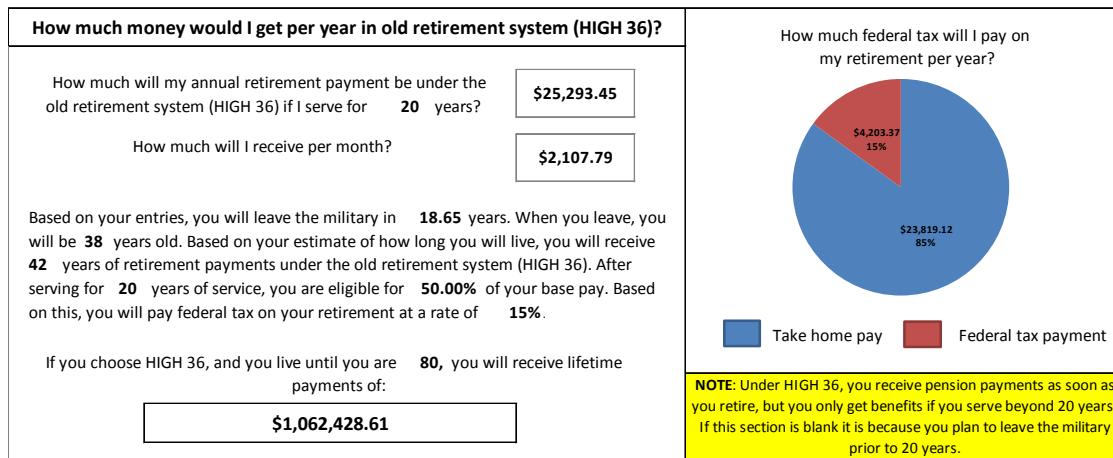


Figure 3. Cash Flow Analysis of the HIGH-36 Pension within the RETIRE Tool

It is important to discuss a few of the underlying assumptions built into the cash flow analysis so that readers of this research understand the logic behind the RETIRE Tool. Given that these pension payments described in Figure 3 are not occurring for another 18.65 years, the handling of TVM is critical. Without properly displaying retirement cash flows, service members may be misled to believe that these future payments have greater spending power than they truly have. The two central forces that must be considered are congressionally approved military pay increases and the effect of inflation (Sanchez, 2015). How do these two forces change the spending power of future pension payments in terms of “today’s dollars”? Table 2 is a comparison between military pay raises and inflation between 2006 and 2010.

Table 2. Approved Military Raises and Inflation by Year. Adapted from
 “United States Military Basic Pay History” (n.d.) and
 Worldwide Inflation Data (n.d.).

Year	Military Raise	CPI Inflation
2015	1%	.12%
2014	1%	1.62%
2013	1.7%	1.47%
2012	1.6%	2.07%
2011	1.4%	3.16%
2010	3.4%	1.64%
2009	3.9%	-.34%
2008	3.5%	3.85%
2007	2.7%	2.85%
2006	3.1%	3.24%

During this ten-year period of observation, military pay increases averaged 2.33 percent and inflation averaged 1.968 percent. A study published by the RAND Corporation explored whether military pay is increasing at too high of a rate compared to other factors like inflation (Hosek, 2012). Studying data from 2000 through 2012, Hosek (2012) found that even after adjusting for inflation, military pay is increasing at a rate higher than specified benchmarks. Trends between military pay and inflation over the last four years are much closer, with average military pay increases and inflation between 2012 and 2015 being 1.325 percent and 1.32 percent, respectively. For the purposes of the RETIRE Tool cash flow analysis, the effects of inflation and future military pay increases are treated as equal offsets.

The next assumption rests on this question: Will service members be best served by seeing financial information in ‘today’s dollars’ or in ‘future dollars?’ (GAO, 2015).

The RETIRE Tool was built upon the assumption that service members will benefit from seeing future cash flow payments in ‘today’s dollars,’ or put another way, in today’s spending power. To accomplish cash flow analysis presented in today’s spending power, the RETIRE Tool calculates current military pay and future expected pay (from promotion and TIS) using the 2016 military pay table. Given the previous assumption of inflation and retirement pay offsetting each other, service members are provided with an estimate of the current spending power of future payments. Figure 4 shows the BRS cash flow analysis section of the RETIRE Tool.

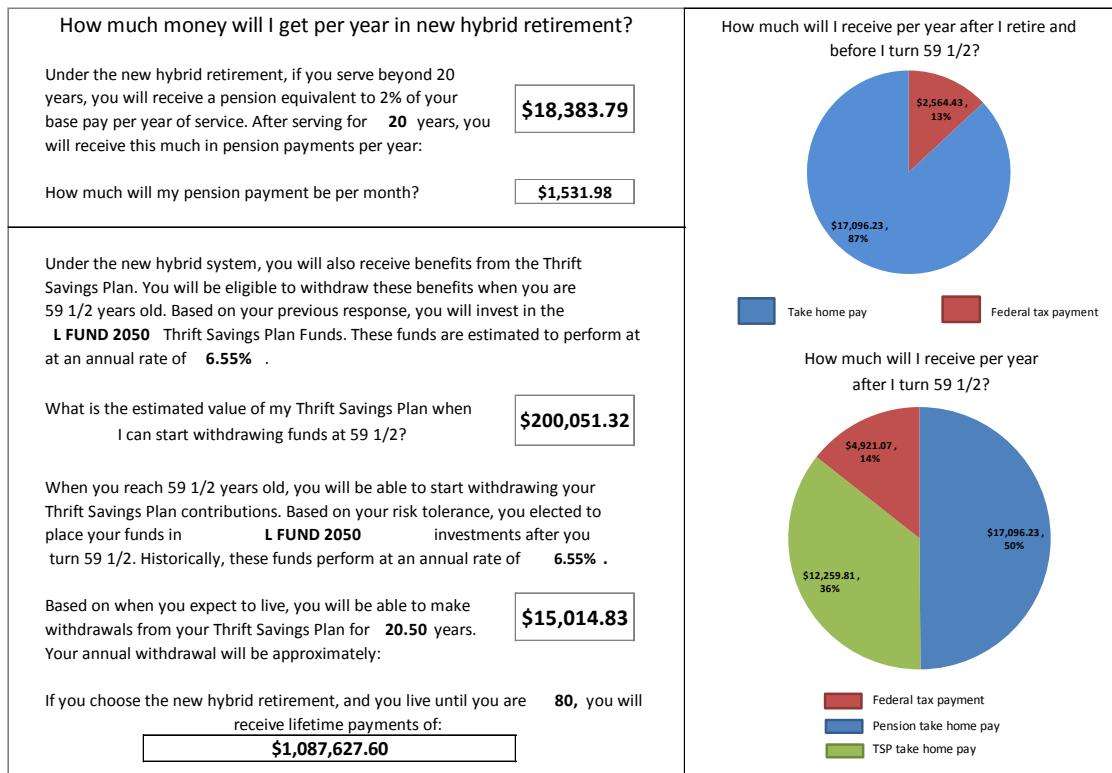


Figure 4. Cash Flow Analysis of the BRS Pension and TSP within the RETIRE Tool

One area of particular focus in the RETIRE Tool is the treatment of market growth of the TSP account with respect to inflation. Given that future withdrawals from the TSP will have a decreased spending power due to inflation, the TSP annuity payment is calculated by estimating future dollar payments and determining an annuity. Next, the

annuity payment is discounted back to present value dollars by a 2 percent estimate supported by research from the Organization for Economic Co-operation and Development (“U.S. Inflation Forecast,” 2016).

2. Tax Impacts

The current structure of federal taxation is a bracketed tax rate based on a tax filer’s taxable income over the year. Table 3 provides the 2016 federal tax brackets for single filers.

Table 3. 2016 Federal Tax Brackets for Single Filers. Adapted from “Tax Brackets” (n.d.).

Single Filing Taxable Income Brackets	Tax Rate
Up to \$9,275	10%
\$9,276 to \$37,650	15%
\$37,651 to \$91,150	25%
\$91,151 to \$190,150	28%
\$190,151 to \$413,350	33%
\$413,251 to \$415,050	35%
\$415,051 or more	39.6%

In an effort to limit the input complexity of the RETIRE Tool while still providing realistic estimates, the RETIRE Tool calculates future cash flow tax liability based on the single filer’s taxable income brackets. Given the long-term nature of these cash flows, the RETIRE Tool was built using a conservative tax approach. It is likely that service members may fall under other tax brackets through marriage, may receive Social Security benefits which impact tax liability, and may also have other sources of income which will

impact tax liability. These impacts would be difficult to estimate, so in attempts to keep the user interface of the RETIRE Tool as simple as possible, they are not included. Therefore, while these additional impacts on tax liability are certainly worthy of investigation, they are outside the scope of this research, so they are not incorporated in the RETIRE Tool.

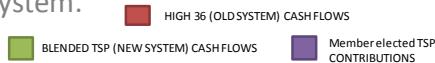
3. Cash Flow Comparison

The cash flow comparison element of the RETIRE Tool was designed to allow service members to visually estimate the future cash flows provided by the HIGH-36 retirement system and compare it to the cash flows of the BRS. In the model, future cash inflows and cash outflows are expected to exist within the following categories:

1. Cash inflow from active-duty pay
2. Cash inflow from BRS Lump Sum payment
3. Cash inflow from HIGH-36 pension
4. Cash inflow from BRS pension
5. Cash inflow from TSP account withdrawals
6. Cash outflow from TSP contributions

The cash flow comparison section combines these categories to provide a graphical estimation of cash flows from present day until the end of the life expectancy of the service member. Figure 5 illustrates the cash flow comparison chart.

This chart shows the estimated combined cash flows of the old retirement system and the new retirement system (annual pay). Included in this analysis is the amount of base pay that you will invest in the Thrift Savings Plan if you select the new retirement system.



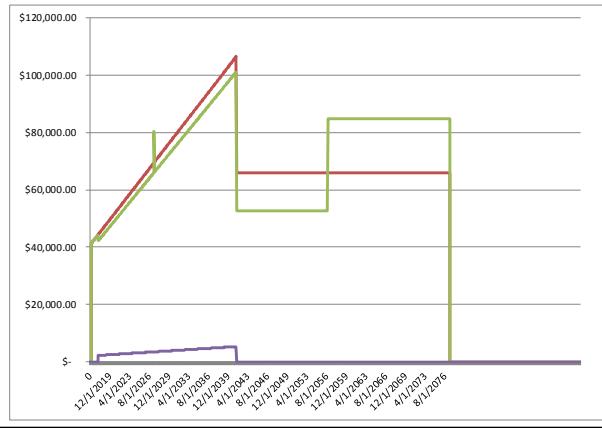


Figure 5. Cash Flow Analysis of the BRS and the TSP within the RETIRE Tool

Identifying future cash inflows and cash outflows is a necessary step towards NPV; however, there is also a value in displaying this financial information graphically. Every service member is expected to weigh the value of the two retirement systems in his or her own way (Tannahill, 2012). The cash flow comparison section provides a visual tool of expected cash inflows and cash outflows. It becomes the responsibility of the service member to interpret his or her own financial value based on these estimates.

Another consideration with the graphical display of financial value is the relatively young population who is making this decision. Tannahill (2012) found that the skill of making financial decisions is at its highest for individuals in their early 50s. Given that the affected population is likely between the ages of 18 and 30, visual tools like the cash flow comparison may provide greater financial clarity in making an otherwise complex decision.

4. Volatility Analysis

When comparing the expected volatility of the HIGH-36 retirement system and the BRS, volatility is virtually non-existent in the HIGH-36 system. In an effort to expand financial literacy in the wake of this change, it became necessary to quantify the volatility of the TSP portion of the BRS. Merriam-Webster defines *volatility* as something “characterized by or subject to rapid or unexpected change” (“Volatile,” n.d.). *Financial volatility* is defined as “a measure of a security's stability. It is calculated as the standard

deviation from a certain continuously compounded return over a given period of time” (“Volatility,” 2012). The measure of expected volatility of Thrift Savings Plan accounts is displayed in Figure 6.

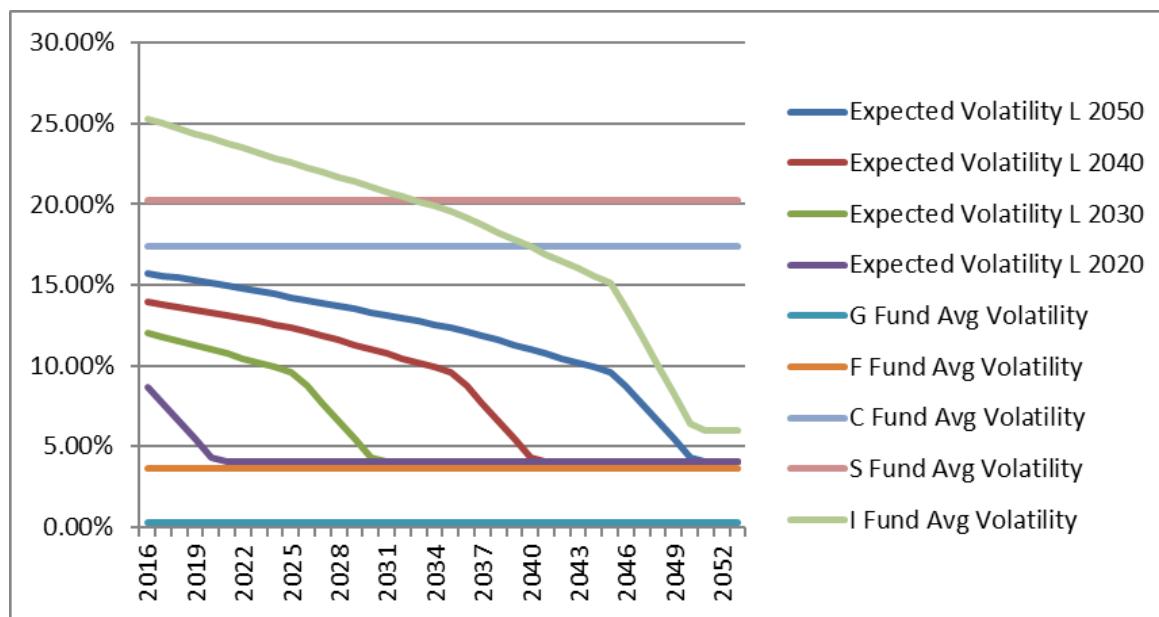


Figure 6. Estimated Volatility of TSP Accounts over Time

This element of the RETIRE Tool displays the TSP account volatility based on the account selection of the service member. Understanding volatility within the TSP accounts is a necessary step toward improving the financial literacy of service members. The RETIRE Tool provides a brief explanation of volatility in conjunction with visual volatility estimates of the selected TSP account.

Volatility and portfolio growth are inherently intertwined. Armstrong found a direct link in his research between portfolio volatility and the “survival of the portfolio at any given time horizon” (Armstrong, 2005, p. 10). Given that the HIGH-36 retirement system has little to no expected volatility, and the BRS has a range of expected volatility, it is useful to educate service members on the potential financial impact of volatility.

5. NPV of Payments

The final element of the RETIRE Tool is a net present value analysis of future cash flow payments. NPV is defined as “the difference between the present value of the future cash flows from an investment and the amount of investment. The present value of the expected cash flows is computed by discounting them at the required rate of return” (“Net Present Value,” n.d.). When NPV is utilized by a business, the rate applied will often be the Weighted Average Cost of Capital (WACC), also referred to as the “hurdle rate” (WACC, 2016). For service members, the Personal Discount Rate (PDR) serves as the required rate of return that would make them indifferent between these cash flows today or at the specified time according to the selected retirement system (Nord, 1987). The formula in Figure 7 was used to calculate NPV.

$$NPV = -C_0 + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \dots + \frac{C_T}{(1+r)^T}$$

$-C_0$ = Initial Investment

C=Cash Flow

r=Discount Rate

T=Time

Figure 7. NPV Formula. Source: NPV%201.gif (2016).

The RETIRE Tool presents NPV as a summed total between the two retirement systems and as a graphical chart. Figure 8 shows the NPV section of the RETIRE Tool. Given that the active-duty pay of service members will be the same between the two retirement systems (except for contributions to the TSP), active-duty pay is not captured within the NPV calculation. The three cash flow categories considered within NPV are as follows:

1. Cash inflows to HIGH-36 retirement from pension payment
2. Cash inflows to BRS from pension payments and TSP Annuity
3. Cash outflows to BRS from TSP contributions by service members

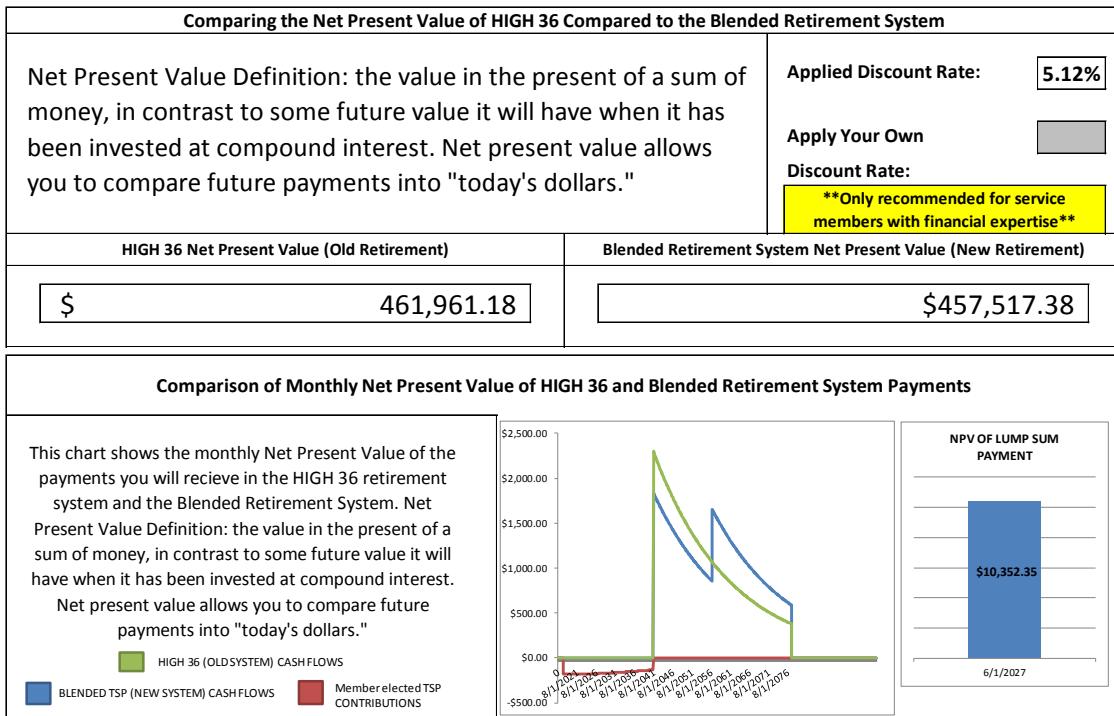


Figure 8. NPV Analysis of HIGH-36 and BRS within the RETIRE Tool

The applied discount rate within the RETIRE Tool is the PDR of the service member. This is calculated through three TVM questions presented to the service member designed to encourage long-term TVM responses. If a service member does not feel that the PDR is truly representative of his or her value of money over time, he or she may override the original discount rate by entering in a different discount rate in the specified field. The PDR determines the total value in the NPV section of the HIGH-36 retirement and the BRS, including the TSP.

NPV has been used by businesses throughout the world as a means to identify a value of a project or financial event in contrast to a specified rate. One method of application of NPV involves the comparison of multiple project options, with preference given toward the project with the highest NPV. Nader (1991) provided strong evidence of the value of NPV in retirement decision making from the perspective of a corporation, but less research could be found that takes the perspective of a retirement system

participant. This research attempts to identify the perceived value of the NPV that service members hold when choosing between HIGH-36 and the BRS.

E. INVESTMENT RISK OF THE TSP

1. Historical Returns

The TSP was created through an act of Congress in 1986 (“Thrift Savings Fund,” 2016). In its present state, service members are eligible to invest in ten different TSP funds with differing levels of risk and expected returns. Provided that service members elect the BRS, they will also have to make a contribution choice between the available TSP funds. This section is designed to identify the financial risk, return, and volatility within the TSP fund that service members must factor into their decision. Figure 9 shows the historical performance of the TSP funds.

Year	L Income	L 2020	L 2030	L 2040	L 2050	G Fund	F Fund	C Fund	S Fund	I Fund
2015	1.85%	1.35%	1.04%	0.73%	0.45%	2.04%	0.91%	1.46%	-2.92%	-0.51%
2014	3.77%	5.06%	5.74%	6.22%	6.37%	2.31%	6.73%	13.78%	7.80%	-5.27%
2013	6.97%	16.03%	20.16%	23.23%	26.20%	1.89%	-1.68%	32.45%	38.35%	22.13%
2012	4.77%	10.42%	12.61%	14.27%	15.85%	1.47%	4.29%	16.07%	18.57%	18.62%
2011	2.23%	0.41%	-0.31%	-0.96%		2.45%	7.89%	2.11%	-3.38%	-11.81%
2010	5.74%	10.59%	12.48%	13.89%		2.81%	6.71%	15.06%	29.06%	7.94%
2009	8.57%	19.14%	22.48%	25.19%		2.97%	5.99%	26.68%	34.85%	30.04%
2008	-5.09%	-22.77%	-27.50%	-31.53%		3.75%	5.45%	-36.99%	-38.32%	-42.43%
2007	5.56%	6.87%	7.14%	7.36%		4.87%	7.09%	5.54%	5.49%	11.43%
2006	7.59%	13.72%	15.00%	16.53%		4.93%	4.40%	15.79%	15.30%	26.32%
2005						4.49%	2.40%	4.96%	10.45%	13.63%
2004						4.30%	4.83%	11.20%	17.84%	19.17%
Since Inception	4.14%	5.48%	5.97%	6.27%	3.95%	5.29%	6.45%	10.09%	8.37%	4.23%

Figure 9. TSP Fund Historical Performance

Each service member who elects the BRS will have to make a choice between the TSP funds available. Figure 9 demonstrates that each of these accounts carries different levels of risk and performance rewards. When U.S. markets rise, higher risk funds are likely to rise higher than more conservative funds. Conversely, when U.S. markets are in recession, higher risk funds are likely to drop at a rate much greater than more conservative funds. Providing historical performance of the TSP funds helps service members to gain a financial appreciation of the risk that these funds carry.

2. TSP Volatility

One crucial area that can assist service members in understanding inherent financial risk within the TSP is investment volatility. As described previously, financial volatility is “a measure of a security's stability” (“Volatility,” 2012, p. 1). Volatility can be measured by looking at past historical performance and using that past performance to project future volatility. The TSP addresses volatility directly by providing service members with a fund comparison matrix that describes expected volatility qualitatively. As the DOD shifts from member-elected participation in the TSP toward the BRS, the education of service members regarding risk and volatility of the TSP will help to maintain a financially prepared armed forces. Figure 10 shows a portion of the TSP fund comparison matrix.

	G Fund	F Fund*	C Fund*	S Fund*	I Fund*	L Funds**
Volatility	Low	Low to moderate	Moderate	Moderate to high — historically more volatile than C Fund	Moderate to high — historically more volatile than C Fund	Asset allocation shifts as time horizon approaches to reduce volatility

Figure 10. TSP Volatility Fund Comparison Matrix. Adapted from “Thrift Savings Plan” (n.d.).

3. Investment Options

All fund options within the TSP are built on an allocation of five core TSP funds:

1. G Fund: Government securities
2. F Fund: Government, corporate, and mortgage-backed bonds
3. C Fund: Stocks from medium and large U.S. companies
4. S Fund: Stocks from small and medium U.S. companies
5. I Fund: International stocks

(“Thrift Savings Plan,” n.d.)

The TSP also provides the Lifecycle Income Fund, the Lifecycle 2020, Lifecycle 2030, Lifecycle 2040, and Lifecycle 2050 funds, which are discussed later. The Lifecycle funds are a mixed allocation of the five core TSP funds. Another feature within the TSP allows for service members to elect contributions to TSP funds of their choosing. This allows the service member to decide his or her own ratio of fund allocation beyond what is offered through the Lifecycle Funds. In addition to the individual funds, service members can elect to contribute under a traditional contribution, which is pre-taxation, or a Roth contribution, which is post-taxation (“Tax Treatment,” n.d.).

4. Conservative Shift of Investments in the Lifecycle Funds

One of the unique features of the TSP Lifecycle Funds is the shift from high risk investments toward conservative investments over the duration of the fund. The Lifecycle 2050 is designed for participants who anticipate withdrawing funds by 2045 or later (“Lifecycle Funds: L 2050,” n.d.). Each month, the Lifecycle Fund shifts incrementally toward a greater percentage of conservative TSP funds. By the end of a Lifecycle Fund, the fund looks proportionally very similar to the Lifecycle Income fund, a conservative investment account. Figure 11 depicts the starting allocation of the Lifecycle 2050 at inception compared to the projected allocation in 2050 (“Lifecycle Funds: L 2050,” n.d.).

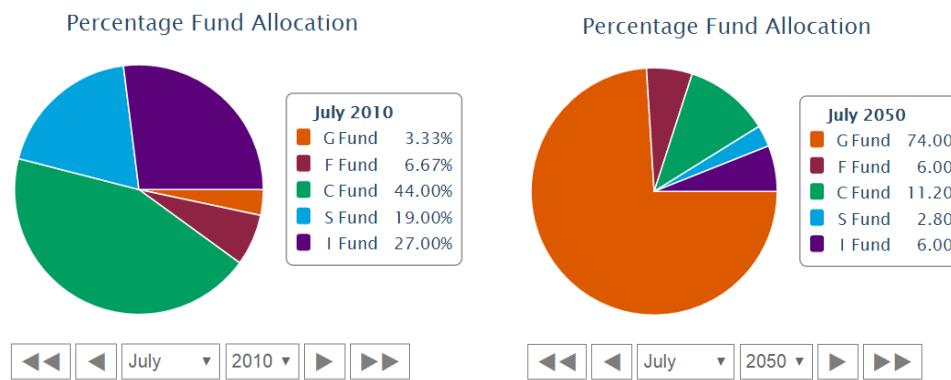


Figure 11. Allocation of the TSP Lifecycle 2050 Fund at Inception and Completion. Adapted from “Lifecycle Funds: L 2050” (n.d.).

Only 16.5 percent of all TSP fund investments occur within the Lifecycle Funds, and 33.06 percent of all TSP Funds are invested in the G Fund (Thrift Savings Fund, 2016). The Lifecycle funds provide an investment option for service members who are not necessarily well versed in financial planning, as these funds reduce risk factors over the life of the account and especially near retirement.

F. SUMMARY

Chapter II included a review of the current environment, including an overview of the pending DOD retirement changes. The chapter included evidence of the variables that affect the future value of the TSP. The chapter provided a comparison between the HIGH-36 retirement system and the BRS. Consideration of the population affected and the expected program implementation were both addressed. Elements of the RETIRE Tool including cash flow analysis, tax impacts, cash flow comparison, volatility analysis, and NPV were presented. Chapter II concluded with a review of the historical returns of the TSP, volatility within the TSP, investment options of the TSP, and the shifting risk of Lifecycle Funds. The next chapter will discuss the methodology used in this research study.

III. METHODOLOGY

A. INTRODUCTION

This chapter provides the rationale behind the methodology used during this research study. It includes an explanation of the RETIRE Tool method of analysis. The methodology of the design and implementation of the pre-survey and post-survey at Naval Postgraduate School with U.S. military officers is also provided. Finally, the discussion of the data analysis method applied is presented in this chapter.

This research is framed around three primary sources of data. The first data element is an anonymous online survey on LimeSurvey called the pre-survey. The second data element is the stored responses of service members using the RETIRE Tool. The third data element is an anonymous online survey on LimeSurvey called the post-survey. The pre-survey and the post-survey contain questions that measure a change in participant's financial decisions, his or her level of confidence regarding those decisions, and levels of financial knowledge prior to a RETIRE Tool intervention.

B. RETIRE TOOL METHOD OF ANALYSIS

1. Inputs of the RETIRE Tool

The RETIRE Tool was developed prior to the conduct of this research incorporating various financial concepts and theories. A portion of the "Investment Risk Tolerance Quiz" created by Dr. John Grable and Dr. Ruth Lytton was used with written permission (Grable & Lytton, 1999). The RETIRE Tool includes 18 required inputs from a service member with one optional input concerning the personal discount rate (PDR). These 18 required inputs are used to calculate and display nine time calculations, 19 financial calculations, 13 percentage calculations, and seven financial charts for service members to evaluate. A component of this research is the identification of the features in the RETIRE Tool that service members find most valuable to help them make an informed financial decision between the two retirement systems. Service members will be asked to identify the most valuable features of the RETIRE Tool.

2. Target Population of the RETIRE Tool

Given the limited time to complete this research, the RETIRE Tool was developed for a target audience of active-duty service members only. During the research, participants were asked to use the RETIRE Tool and to save responses that matched their most likely circumstances. These responses are compared and analyzed in Chapter IV. The RETIRE Tool responses coupled with the pre-survey and post-survey responses form the foundation upon which the conclusions and recommendations are presented.

3. Population Sampling

A sample population consisting of active-duty U.S. military officers at NPS are the potential participants in this study. This sample population was chosen to measure the effectiveness of the RETIRE Tool with an officer population who are at varying stages of their military career. This study was approved by the Naval Postgraduate School (NPS) Institutional Review Board (IRB). At the start of the study, participants were assigned a random control number. Participants were then instructed to enter this control number in their pre-survey, their responses within the RETIRE Tool, and in their post-survey.

4. Study Design

In part A of this research study, participants took a voluntary online survey on LimeSurvey. Because participants interacted directly with the researcher, the participants were not anonymous, however the responses they save are anonymous. The pre-survey was completed without influence from the study investigator or senior leadership. The pre-survey is designed to measure the level of confidence service members have regarding their choice between the HIGH-36 retirement system and the BRS. Since the pre-survey was completed prior to participants using the RETIRE Tool, its overall purpose is to measure a baseline of financial confidence before using the RETIRE Tool.

Upon completing the pre-survey, participants were provided with a nine-minute introductory class on how to use the RETIRE Tool. This instruction is designed to help service members understand basic financial terminology that exists within the RETIRE

Tool. Service members were introduced to financial terms including investment volatility, net present value (NPV), annuity, and time value of money (TVM). The nine-minute instruction marks the end of part A of the study.

In part B of this research study, participants returned to a computer station and were given access to the RETIRE Tool. Participants received instructions to enter basic information including their current pay grade date of birth, armed forces active duty base date (AFADBD), expected total YOS, expected pay grade, and life expectancy. In the next section of the RETIRE Tool, participants answered six questions designed to identify the participant's investment risk tolerance. Participants then answered an additional three questions designed to calculate a participant's Personal Discount Rate (PDR). Finally, participants elected which TSP fund they would select under the BRS and entered their contribution of base pay. Upon entering this information, the RETIRE Tool then provided participants with financial value estimations of the HIGH-36 retirement system compared to the Blended Retirement System (BRS). Participants were then instructed to save their RETIRE Tool evaluation with the responses that best represent their unique circumstances.

After using the RETIRE Tool and saving their responses, participants took a voluntary online survey with anonymous responses in LimeSurvey. This post-survey consisted of a portion of questions from the pre-survey and additional questions that were only relevant after using the RETIRE Tool. The post-survey is designed to measure the change in the level of confidence service members experienced as a result of using the RETIRE Tool. The post-survey also measured the effectiveness of the RETIRE Tool by asking participants to identify the most useful aspects of the RETIRE Tool. All three participant inputs (pre-survey, RETIRE Tool entries, and post-survey) were linked together using an identical but random control number, which was initially assigned to each participant.

Analysis of the pre-survey, RETIRE Tool entries, and post-survey was accomplished using quantitative and qualitative factors. Qualitative factors were used to measure the level of confidence service members felt as a result of using the RETIRE Tool. Qualitative factors were used to measure the usefulness of features within the

RETIRE Tool. Analysis of the quantitative and qualitative factors will be used to answer the research questions, to form conclusions, and to provide recommendations based on research analysis, and recommendations for future research. Given the time sensitive nature of the choice between the HIGH-36 retirement system and the BRS, an emphasis was placed on analyzing the effectiveness of the RETIRE Tool.

C. SURVEYING NPS STUDENTS

Research participants were selected from the Naval Postgraduate School (NPS) in Monterey, California. NPS active-duty U.S. military officers were solicited via an email message. The student investigator sent the recruitment message to potential participants via e-mail and provided available times to participate in the research at a computer lab at NPS. Participants were asked to complete a pre-survey on LimeSurvey at the start of the research. This survey was designed to measure a baseline of a participant's level of confidence regarding their decision between the HIGH-36 retirement system and the BRS. The pre-survey on LimeSurvey consists of 20 questions with anonymous responses using an online survey on LimeSurvey. Participants responded to questions regarding their participation in the Thrift Savings Plan (TSP), their decision between the two retirement systems, their level of experience with investing, and their level of confidence given the decision that they face.

After completing the pre-survey, participants were asked to watch a nine-minute recorded PowerPoint presentation describing the elements of the RETIRE Tool. The PowerPoint also provided definitions of financial terminology used within the RETIRE Tool. The PowerPoint was pre-recorded to ensure that each participant received the same information prior to using the RETIRE Tool. Since the study included multiple sessions with service members, pre-recording the PowerPoint ensured that this part of the study took the same amount of time for each session.

While using the RETIRE Tool, participants were asked to enter their random control number. This allowed the researcher to link the pre-survey, the post-survey and the results of the RETIRE Tool together for each participant. While using the RETIRE Tool, participants were asked to answer 18 questions and then review the RETIRE Tool

analysis given their unique variables. Participants were asked to notify the researcher once they were ready to save their results. The participants were instructed to save the results from the RETIRE Tool on a CD marked with only the random control number.

After using the RETIRE Tool, participants were asked to complete a post-survey. The post-survey contains the original 20 questions contained in the pre-survey, plus an additional seven questions only relevant after using the RETIRE Tool. The post-survey is designed to measure the change in level of confidence service members feel after using the RETIRE Tool. Given that the original 20 pre-survey questions exist in the post-survey, this allowed researchers to analyze the change in responses to survey questions. Each participant was assigned an anonymous random control number which linked the results from the pre-survey, the RETIRE Tool, and the post-survey. This allowed for a comparative analysis between the pre-survey and the post-survey results.

D. PRE-SURVEY AND POST-SURVEY QUESTIONS

The pre-survey and post-survey used within this research study was developed by the researcher as a means to measure a change in level of confidence of study participants. Officers at NPS were asked to answer questions regarding their decision between HIGH-36 and the BRS, their involvement with TSP, investment decisions, financial experience, knowledge of the two retirement systems, and confidence surrounding the service member's ability to decide between the two retirement systems. With regard to levels of confidence, this measurement was utilized because the RETIRE Tool was built as a tool to assist the service member with making a retirement decision. As such, the implied value of the tool is with the service member.

Similar measurements of confidence were utilized in other research examining judgment of long-range investment decisions and the measurement of participant's confidence (Phadnis, Caplice, Sheffi, & Singh, 2015). A positive change in the level of confidence may suggest that the RETIRE Tool can assist service members in their choice between HIGH-36 and the BRS. A negative change or no change in confidence level may suggest that additional financial literacy may be necessary to use the RETIRE Tool or that the elements of the RETIRE Tool could be designed better to assist service members.

E. DATA ANALYSIS METHOD

This research uses descriptive statistics based on the three sources of data input: the pre-survey, the RETIRE Tool, and the post-survey responses. Pre-survey and post-survey analysis was accomplished through an analysis of variance (ANOVA) statistical comparison to determine statistical significance of the change. ANOVA analysis was conducted using a t-test “paired two sample for means.” All data inputs were captured and converted into numerical values using Microsoft Excel. Participant responses were analyzed as standalone data (a combination of the participant’s pre-survey, RETIRE Tool, and post-survey responses) and also as aggregate responses. This facilitated a micro and macro analysis of participant responses. The pre-survey was used as a baseline level of confidence and the post-survey was used as a measure of change given the use of the RETIRE Tool. The RETIRE Tool responses serve as a vital link between the two surveys to identify the expected financial value of the two retirement systems given the unique responses of each service member.

F. SUMMARY

This chapter provided an introduction to the methodology of this research and the methods of analysis within the RETIRE Tool. The chapter continued with an explanation of the purpose of the pre-survey and post-survey and the participation of U.S. military officers at NPS. This chapter concluded with a discussion of the data analysis methods used within this research. The next chapter discusses the analysis and results of this research study.

IV. ANALYSIS AND RESULTS

A. INTRODUCTION

This chapter introduces the analysis of data captured from the pre-survey and the post-survey responses submitted by the participants. The pre-survey was designed to measure a baseline of the participant's financial decisions, his or her level of confidence regarding those decisions, and levels of financial knowledge prior to a RETIRE Tool intervention. The pre-survey baseline is measured against the post-survey responses to determine changes resulting from a RETIRE Tool intervention. The effect of the intervention was measured through a change in response of 20 questions in the pre-survey and the post-survey. Additional questions presented in the post-survey will be analyzed to determine the most useful features of the RETIRE Tool and resources that can better assist service members given the choice between HIGH-36 and the BRS.

Pre-survey and post-survey analysis will be accomplished through an analysis of variance (ANOVA) statistical comparison to determine the statistical significance of the change. ANOVA analysis was conducted using a t-test "paired two sample for means."

B. RESEARCH PARTICIPATION

On November 14, 2016, 998 Naval Postgraduate School (NPS) students were solicited by e-mail to participate in the research. Between November 15 and November 18, 2016, 35 participants met with the researcher in an NPS computer lab to conduct the research. At the conclusion of the research sessions, 35 military officers provided responses within the pre-survey, the RETIRE Tool, and the post-survey. Of the 35 participants, one survey had incomplete responses. This results in a sample population of 34 participants.

1. Sample Population Characteristics

Research participants were comprised of U.S. military officers whose current pay grades ranged from O-1 through O-4. Participants self-identified which pay grade they expect to achieve prior to leaving the military. The left side of Table 4 shows the current

pay grades of participants. The right side of Table 4 shows the future pay grade that participants expect to achieve prior to leaving the military.

Table 4. Participants' Current and Expected Future Pay Grades

			Expected Future Pay Grades			
Pay Grade	Number in Sample	Percentage of Sample	O-3	O-4	O-5	O-6
O-1	1	2.94%	1			
O-2	3	8.82%	1	1	1	
O-3E	3	8.82%		2	1	
O-3	19	55.88%	1	4	12	2
O-4	8	23.54%			8	
			8.83%	20.58%	64.71%	5.89%

The sample population consisted of a portion of company grade officers and a portion of field grade officers. Since the sample population consisted of a mixture of officer pay grades, this suggests that participants may reflect the larger population of officers who face the choice between the HIGH-36 retirement or the BRS retirement. The expected future pay grade which participants selected suggest that junior officers may have lower expectations of future expected pay grades.

2. Personal Discount Rates of Participants

A discussion on the observed personal discount rates (PDRs) of participants is provided to show that the sample population displayed similar characteristics to a larger officer population. PDR is a rate that leaves a service member indifferent between a discounted present value payment and a future payment. While using the RETIRE Tool, each research participant was asked three questions to estimate his or her PDR. The time-

horizon of PDR questions one and two within the RETIRE Tool change based on the age of the participant. The RETIRE Tool calculates the time-horizon in PDR questions as the number of years remaining until the service member reaches 59 ½ years of age. PDR questions were designed to ask time value of money questions with a time-horizon identical to TSP account maturity. The following three questions were presented to participants:

1. If you were offered \$10,000 in ____ years, what payment would make you indifferent to this choice if you received it today?
2. How much would you expect to receive in ____ years if you loaned \$10,000 to someone today?
3. What rate of return do you expect when you make investments?

PDR questions one and two were used to calculate an inferred rate of return that service members identify. This is accomplished using the RATE function within Microsoft Excel. The three PDR responses were averaged to create the service members estimated PDR. Figure 12 shows the observed PDRs of participants.

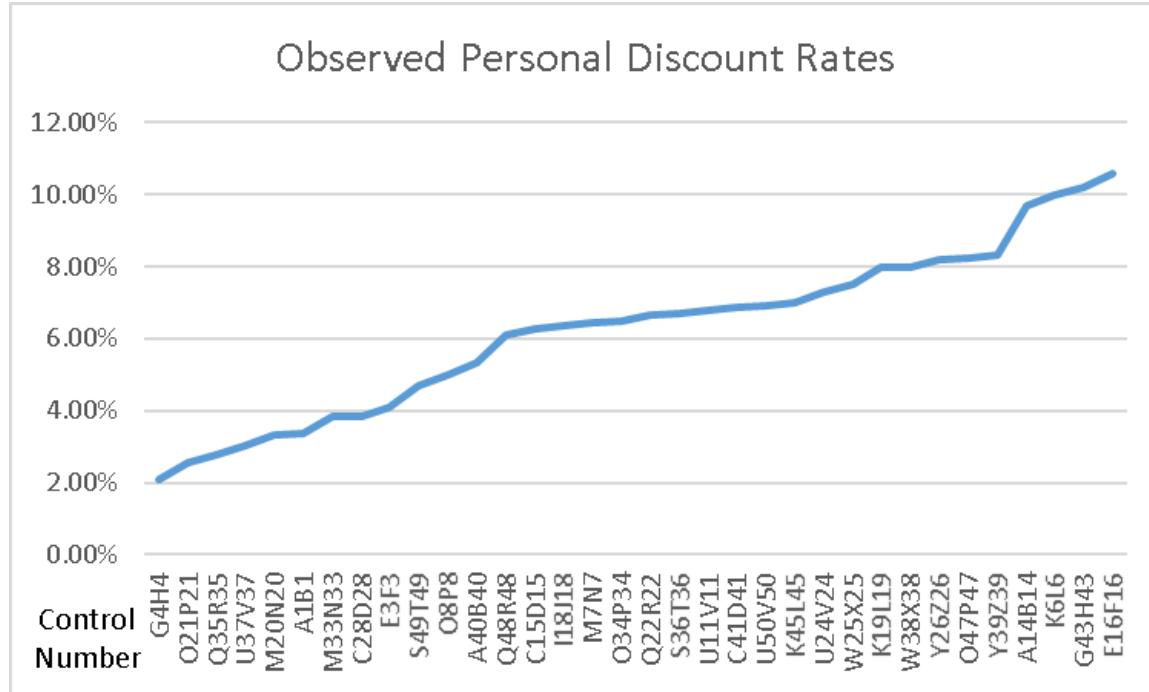


Figure 12. Observed Personal Discount Rates while Using the RETIRE Tool

Research participants responded with PDRs as low as 2.07 percent and as high as 10.57 percent. The average PDR of the sample population was 6.25 percent. Prior research found that U.S. military officers had a 6.49 percent average PDR within a sample population of 20,000 (Cunha & Menichini, 2014). This suggests that the sample population of officers in this research has a similar time value of money preference as the larger population of officers found in Cunha and Menichini's (2014) study.

3. Participants Who Plan to Serve Less Than 20 Years

One of the identified benefits of the BRS retirement system is that it will provide retirement benefits to service members who do not reach 20 years of service (YOS) (DOD, 2016). While it is not yet possible to determine how many of the research participants will complete 20 YOS, some participants indicated that they do not plan to serve for 20 YOS. In total, 14.71 percent of participants plan to serve less than 20 YOS. This demonstrates that the sample population contains officers who intend to serve for less than 20 years as well as officers who intend to serve for 20 years or more.

C. ANALYSIS OF PARTICIPANTS' LEVEL OF CONFIDENCE GIVEN THE CHOICE BETWEEN HIGH-36 AND THE BRS

1. Hypothesis

Given that the DOD has yet to fully implement the education plan supporting the BRS 'opt-in' period, service members have not yet been fully educated on the differences between HIGH-36 and the BRS. It is expected, therefore, that service members' level of confidence given the choice between HIGH-36 and the BRS would be relatively low prior to this research. The first hypothesis to be considered through analysis is that an intervention using the RETIRE Tool will result in higher levels of confidence among research participants.

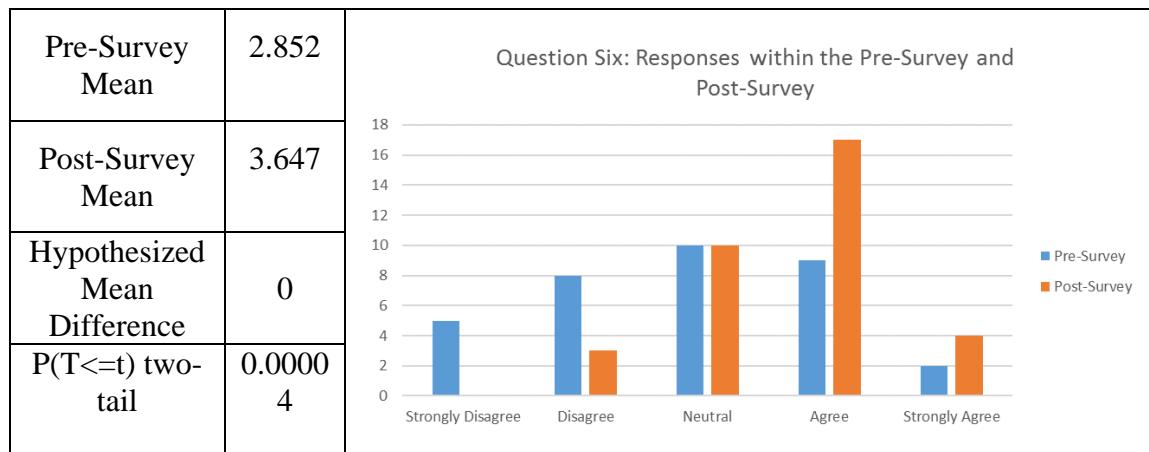
2. Data Organization

Survey responses were collected in the pre-survey and post-survey to answer the following research question: "what effect will the use of the RETIRE Tool have on U.S. service members' level of confidence when deciding between the HIGH-36 retirement

system and the BRS?" Question six within the pre-survey and the post-survey asked participants to describe how they feel about the following statement: "I feel confident about my knowledge level when choosing between the current retirement system and the new retirement system." Participants were provided the following five Likert scale options: 1. Strongly Disagree, 2. Disagree, 3. Neutral, 4. Agree, 5. Strongly Agree. Changes in the responses of question six were analyzed using ANOVA after a RETIRE Tool intervention.

Table five depicts the ANOVA results and the responses within the pre-survey and the post-survey. The ANOVA was created with a hypothesized mean difference of zero and a .05 level of significance. Pre-Survey responses are indicated in blue columns and post-survey responses are indicated in orange columns. Pre-survey mean scores and post-survey mean scores are 2.852 and 3.647 respectively. The observed two-tail p-value is 0.00004.

Table 5. Question Six ANOVA Results and Responses within the Pre-survey and Post-survey



In the pre-survey responses, 38.23 percent of the participants indicated that they either strongly disagreed or disagreed with the statement. After using the RETIRE Tool, this population was reduced to 8.82 percent. Participants who agreed or strongly agreed with the statement grew from 32.35 percent in the pre-survey to 61.76 percent of the

participants in the post-survey. Responses indicating a participant felt neutral about the statement remained at 29.41 percent.

3. Analysis of Pre-survey and Post-survey Responses to Survey Question Six, Question Seven, and Question Ten

The sample population mean increased as a result of the RETIRE Tool invention. This change from the pre-survey baseline to the post-survey responses was statistically significant, with a measured two-tail p-value of 0.00004. In the post-survey, no participants indicated that he or she strongly disagreed with the statement. This indicates that service members who feel a lack of confidence given the choice between the two retirement systems are likely to increase their confidence by using the RETIRE Tool. This provides evidence to support the hypothesis that a RETIRE Tool intervention would increase service members' level of confidence given the choice between HIGH-36 and the BRS.

Survey question seven was also found to be statistically significant. Question seven asked participants to answer a Likert scale question to determine if participants feel they have enough information to make an informed financial decision to choose between HIGH-36 and the BRS.

Similar results were observed within survey question ten. Question ten asked participants to answer a Liker scale question to determine how confident they were in their decision between HIGH-36 and the BRS. The results of all survey questions are available in Appendix B.

D. ANALYSIS OF CONFIDENCE TO CHOOSE BETWEEN HIGH-36 AND THE BRS WITHOUT ADDITIONAL TRAINING

1. Hypothesis

While the previous hypothesis considered the level of confidence that the service members *feel* about their choice between HIGH-36 and the BRS, this section considers if service members are confident to *choose* between HIGH-36 and the BRS. The first question is asking service members to categorize the confidence about the choice they must make, and the second question is asking whether they are ready to make the choice.

Service members who are eligible for BRS must make an election between January 1, 2018 and December 31, 2018 (DOD, 2016). Identifying whether service members are ready to make a decision between the two retirement systems will provide additional evidence that the RETIRE Tool can affect confidence levels. This section considers the following hypothesis: after using the RETIRE Tool, service members will be ready to choose between HIGH-36 and the BRS.

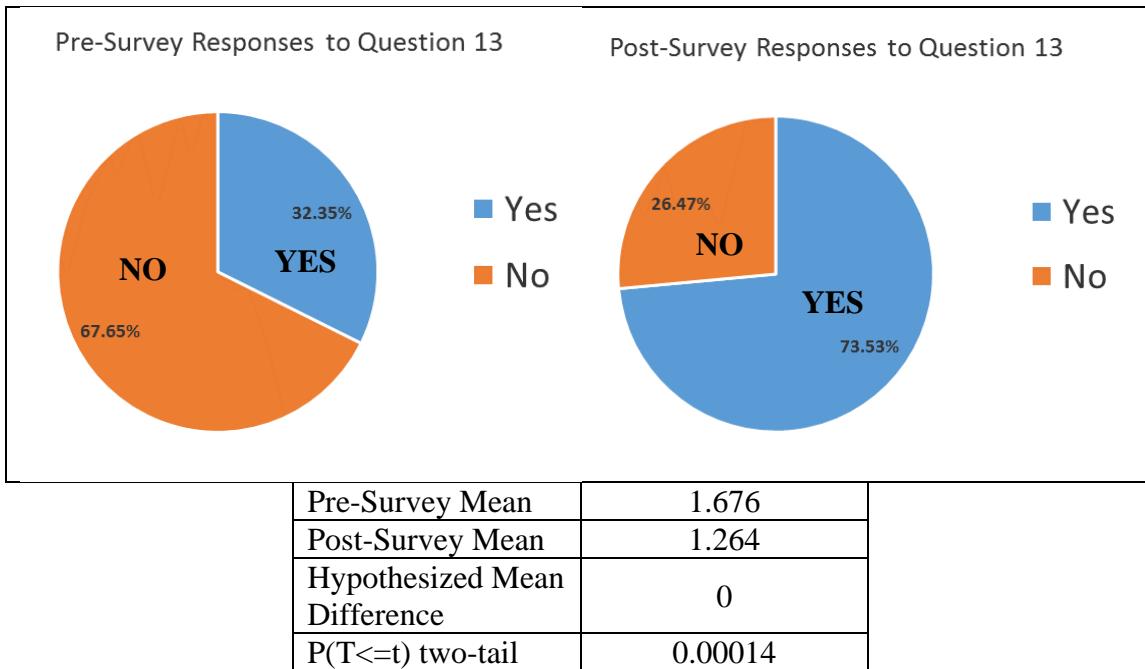
2. Data Organization

Question 13 of the pre-survey and the post-survey asked participants to answer if the following statement is true for him or her: “I feel confident that I am prepared to choose between the old retirement system and the new retirement system, and I do not need additional training.” Participants were given the following two choices: 1. Yes, 2. No. Changes in the pre-survey baseline and the post-survey responses were measured using ANOVA after a RETIRE Tool intervention.

Table 6 shows participant responses to question 13 from the pre-survey in a pie chart on the left, and post-survey responses in a pie chart on the right. Pre-survey and post-survey participants who answered “Yes” to question 13 are identified in blue. Pre-survey and post-survey participants who answered “No” to question 13 are identified in orange.

The ANOVA for question 13 was created with a hypothesized mean difference of zero and a .05 level of significance. In the pre-survey, 32.35 percent of the participants responded “Yes,” and 67.65 percent of the participants responded “No.” In the post-survey, 73.53 percent of the participants responded “Yes,” and 26.47 percent of the participants responded “No.” Pre-survey mean scores and post-survey mean scores moved from 1.676 to 1.264 as a result of a decrease in “No” responses (a value of two) and an increase in “Yes” responses (a value of one). The observed two-tail p-value was 0.00014.

Table 6. Question 13 ANOVA Analysis and Responses within the Pre-survey and Post-survey



3. Analysis of Pre-survey and Post-survey Responses to Survey Question 13

The change in response to question 13 within the pre-survey and the post-survey was found to be statistically significant using ANOVA analysis. A 41.18 percent increase in “Yes” responses from the pre-survey baseline to post-survey responses was observed. This provides evidence that the RETIRE Tool can provide assistance to service members who currently do not feel prepared to choose between HIGH-36 and the BRS. Question 13 asked participant to select “Yes” only if they agreed with both statements (confident to choose between retirement systems and not needing additional training). There may have been a portion of participants who found value in the RETIRE Tool, but still need additional training to be ready to make a decision (and selected “No” as a result). Later in this chapter, the recommendations of the participants will be considered to determine what additional training may assist them.

E. ANALYSIS OF CHANGES IN LEVELS OF KNOWLEDGE AFTER A RETIRE TOOL INTERVENTION

1. Hypothesis

DOD leaders have indicated that greater financial literacy is necessary given the new features of the BRS (DOD, 2016). The necessity for increased financial literacy was also identified in the findings of the Retirement Modernization Commission (Bryant et al., 2015). It can be inferred that the DOD and the Retirement Modernization Commission find a link between financial literacy and readiness factors within the military. Increases in financial literacy may help service members to choose between HIGH-36 and the BRS, but it may also improve other factors related to military readiness. This section considers the following hypothesis: a RETIRE Tool intervention will lead to higher levels of financial knowledge among participants.

2. Data Organization

Question five of the pre-survey and the post-survey asked participants to select an answer that best describes his or her current level of knowledge in the following six categories: retirement pensions, TSP, investment volatility, net present value (NPV), HIGH-36 retirement, and BRS retirement. Participants were provided the following five Likert scale options: 1. Little to no knowledge, 2. Some knowledge, 3. Average level of knowledge, 4. Quite a bit of knowledge, and 5. A high level of knowledge. Changes in the responses of question five were analyzed using ANOVA after a RETIRE Tool intervention.

Figure 13 shows the percentage of changes in levels of knowledge after a RETIRE Tool intervention as well as an ANOVA analysis. Percentages were calculated by measuring the increase of knowledge in a category divided by the average pre-survey score within that same category. The observed change in levels of knowledge ranged between 2.06 percent and 42.11 percent within the six categories after using the RETIRE Tool.

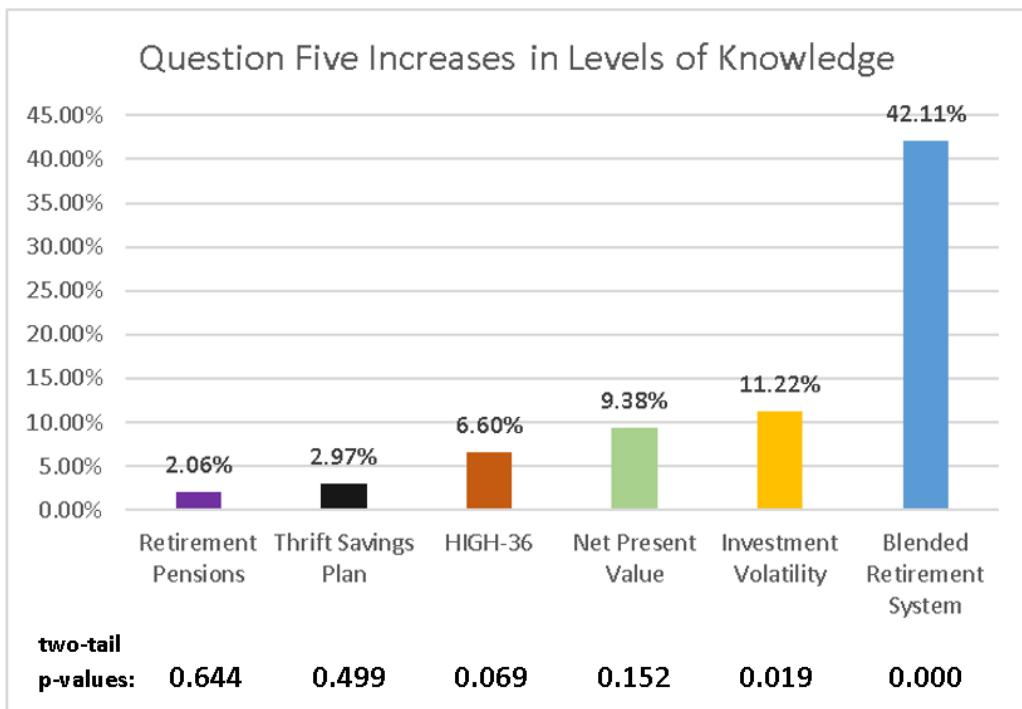


Figure 13. Question Five Changes in Levels of Knowledge and Two-Tail P-values

Of the six knowledge categories analyzed in question five, four categories did not show evidence of statistical significance, and two categories did show evidence of statistical significance. The categories which did not show statistical significance were retirement pensions, TSP, HIGH-36 retirement, and NPV. The HIGH-36 retirement category passed the one-tail p-value but failed the two-tail p-value within ANOVA. The two categories which show statistical significance are investment volatility and the BRS retirement.

3. Analysis of Pre-survey and Post-survey Responses to Survey Question Five

The hypothesis that using the RETIRE Tool will lead to higher levels of knowledge is supported by evidence in the knowledge categories of financial volatility and the BRS retirement. Evidence did not support the hypothesis within the other four categories. This may have been a result of a pre-existing high degree of knowledge of participants or it may be a result of participants not feeling that he or she gained

knowledge in these categories when they used the RETIRE Tool. The knowledge gained regarding the BRS retirement was observed at a much higher rate compared to the other categories. This suggests that the RETIRE Tool can assist with service member levels of knowledge regarding the BRS.

4. Additional Analysis of Levels of Knowledge

Further evidence to support the hypothesis that participants gained financial knowledge through using the RETIRE Tool is found in question 11 within the pre-survey and the post-survey. Prior to the RETIRE Tool intervention, participants were asked to select the highest category where they gained knowledge about HIGH-36 and the BRS. In the pre-survey, participants were given the following five choices: 1. My own research, 2. Information from other service members, 3. Military training, 4. Family and friends, and 5. A financial professional. In the post-survey, participants were given the original five choices plus an additional two choices: 6. Using the RETIRE Tool and 7. Today's class.

Survey question eleven was found to be statistically significant with a two-tail p-value of 0.0166. When given the additional choices of the RETIRE Tool or the introductory class in the post-survey, 64.70 percent of participants indicated that one of these two options became the highest category where he or she gained knowledge and awareness of HIGH-36 and the BRS. This provides further evidence supporting the RETIRE Tool's impact on levels of financial knowledge.

F. ANALYSIS OF TSP CONTRIBUTION DECISIONS

1. Hypothesis

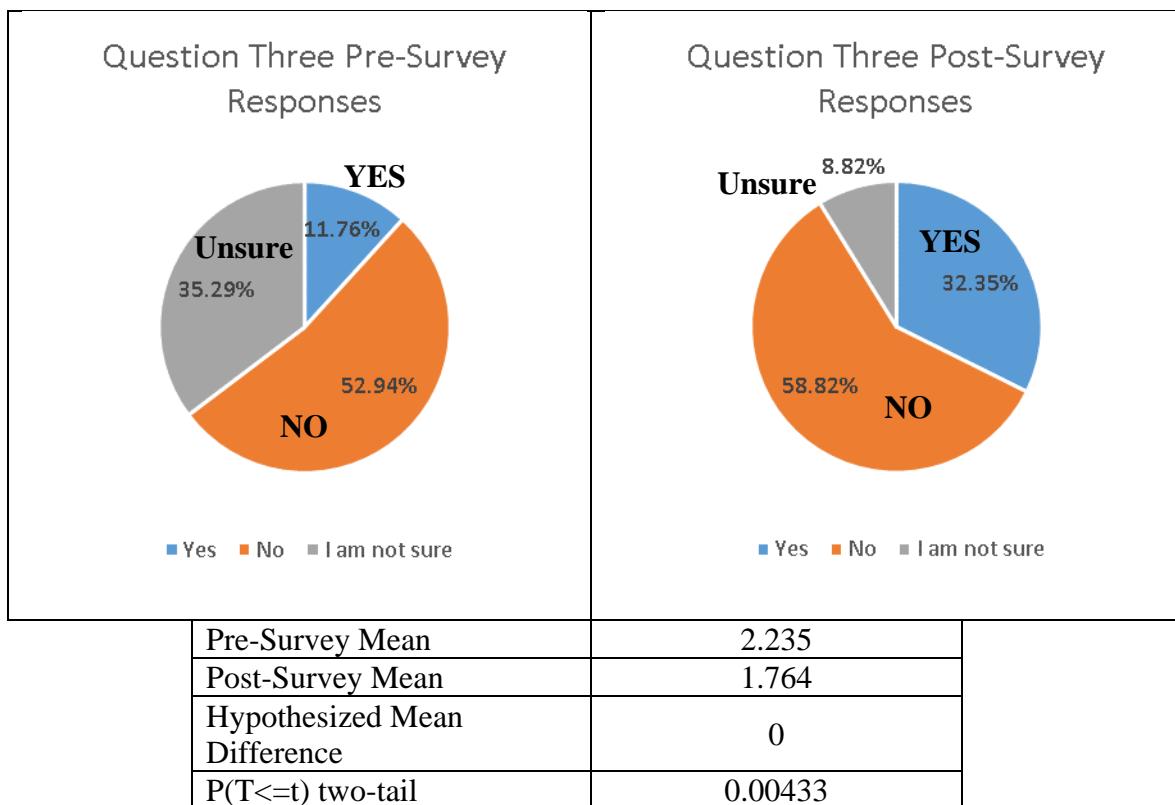
With the addition of government matched TSP contributions, service members who are not currently contributing to the TSP may now consider starting TSP allotments. It is expected that service members who are eligible to choose the BRS will seek financial education about the benefits of contributing to the TSP. Even service members who do not elect the BRS may choose to contribute to the TSP as a result of increased financial awareness. This section considers the following hypothesis: using the RETIRE Tool will impact the participant's decision to contribute to the TSP.

2. Data Organization

Question three within the pre-survey and the post-survey asked participants to identify if his or her choice between HIGH-36 and the BRS will impact his or her decision to contribute to the TSP. Three choices were available for this question: 1. Yes, 2. No, and 3. I am not sure. Changes in the responses of question three were analyzed using ANOVA after a RETIRE Tool intervention.

Table 7 shows the survey question three ANOVA analysis, pre-survey responses, and post-survey responses. Participants who responded “Yes” are indicated by blue in the pre-survey and the post-survey. Participants who responded “No” are indicated by orange, and participants who responded “I am not sure” are indicated in gray.

Table 7. Question Three ANOVA Analysis, Pre-survey, and Post-survey Responses



Within the pre-survey, 35.29 percent of participants indicated that he or she was unsure if the decision between HIGH-36 and the BRS would impact their contribution to the TSP. This response was reduced to 8.82 percent in the post-survey as a result of RETIRE Tool intervention. 32.35 percent of participants indicated in the post-survey that the decision between HIGH-36 and the BRS would impact their decision to contribute to the TSP.

3. Analysis of Pre-survey and Post-survey Responses to Survey Question Three

Pre-survey and post-survey question three was found to be statistically significant, with an observed two-tail p-value 0.00433. This provides evidence to support the hypothesis that using the RETIRE Tool will impact the participant's decision to contribute to the TSP. The population that appears to be affected the most are service members previously unsure if the decision between HIGH-36 and the BRS will impact his or her decision to contribute to the TSP.

A higher percentage of participants indicated the choice between HIGH-36 and the BRS would impact their decision to contribute to the TSP than participants that indicated they would choose the BRS (32.35 percent and 26 percent, respectively). This suggests that some service members may start contributing to the TSP after using the RETIRE Tool even though they do not plan to participate in the BRS.

G. ANALYSIS OF DECISIONS BETWEEN HIGH-36 AND THE BRS

1. Hypothesis

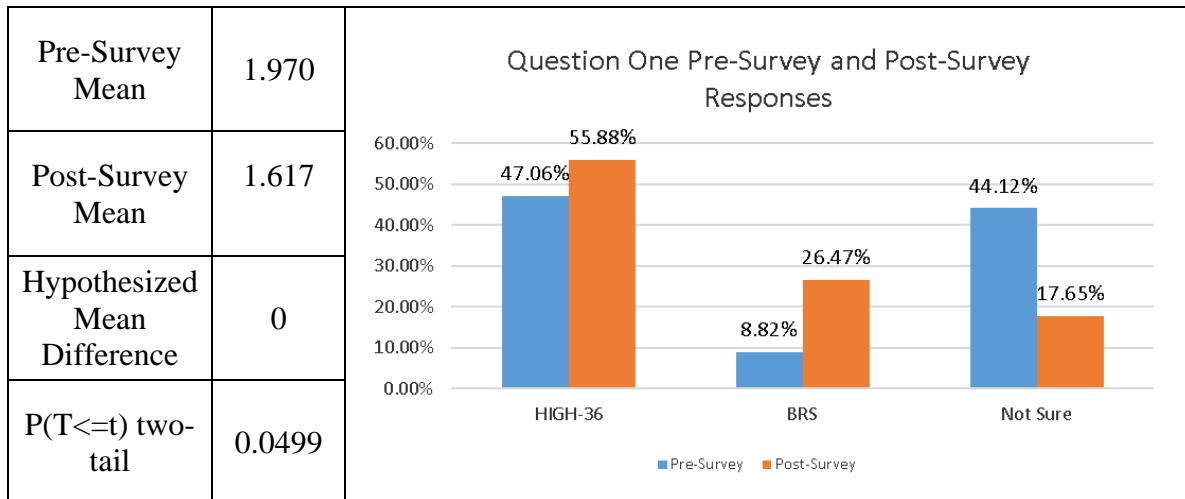
This research study has been designed with a goal of impartiality given the choice between HIGH-36 and the BRS. The researcher has attempted wherever possible to remain indifferent to the retirement decisions that participants display. While the focus of this research has not been a judgment on what retirement system participants select, it is of value to determine if the RETIRE Tool can produce a change in the retirement decisions of participants. Therefore, this section considers the following hypothesis: participants will change his or her decision regarding the choice between HIGH-36 and the BRS after using the RETIRE Tool.

2. Data Organization

Question one of the pre-survey and the post-survey asked participants to identify the answer which best describes his or her choice between HIGH-36 and the BRS. Participants were offered the following three responses: 1. I am planning to choose the current retirement plan (HIGH-36 Retirement Plan), 2. I am planning to choose the new retirement plan (Blended Retirement Plan), and 3. I am not sure which retirement plan to choose. Changes in the responses of question one were analyzed using ANOVA after a RETIRE Tool intervention.

Table 8 shows the ANOVA analysis, the pre-survey responses, and the post-survey responses of survey question one. Pre-survey responses appear as blue columns in the figure and post-survey responses appear as orange columns in the figure.

Table 8. Question One ANOVA Analysis, Pre-survey and Post-survey Responses



A total of 47.06 percent of participants responded in the pre-survey that he or she would choose the HIGH-36 retirement plan. Also in the pre-survey, 8.82 percent of participants responded that he or she would choose the BRS retirement plan. This left 44.12 percent unsure about the decision.

After using the RETIRE Tool, 55.88 percent of participants plan to remain under the HIGH-36. Participants who plan to choose the BRS increased from 8.82 percent to 26.47 percent, and 17.65 percent remained uncertain about which plan to choose.

3. Analysis of Pre-survey and Post-survey Responses to Survey Question One

Survey question one was found to be statistically significant, with an observed two-tail p-value of 0.0499. Among the participants, a RETIRE Tool intervention caused a substantial change from the 15 pre-survey responses of “not sure.” Of those that were “not sure” prior to using the RETIRE Tool, six indicated that they would change from “not sure” to the HIGH-36, five indicated that they would choose BRS, and four remained “not sure.” This provides evidence to support the hypothesis that participants will change his or her decision given a previous decision of HIGH-36, BRS, or uncertainty.

H. ANALYSIS OF PARTICIPANT AWARENESS OF FINANCIAL BENEFIT

1. Hypothesis

One challenge that service members face regarding HIGH-36 and the BRS is determining which retirement system offers them the most financial benefit. To understand these differences, service members may be presented with benefit comparisons of the two retirement systems based upon his or her financial circumstances. It is up to the service member to identify which retirement system provides the most financial benefit after receiving this information. This section considers the following hypothesis: after a RETIRE Tool intervention, participants will be able to identify the retirement system that provides them the most financial benefit.

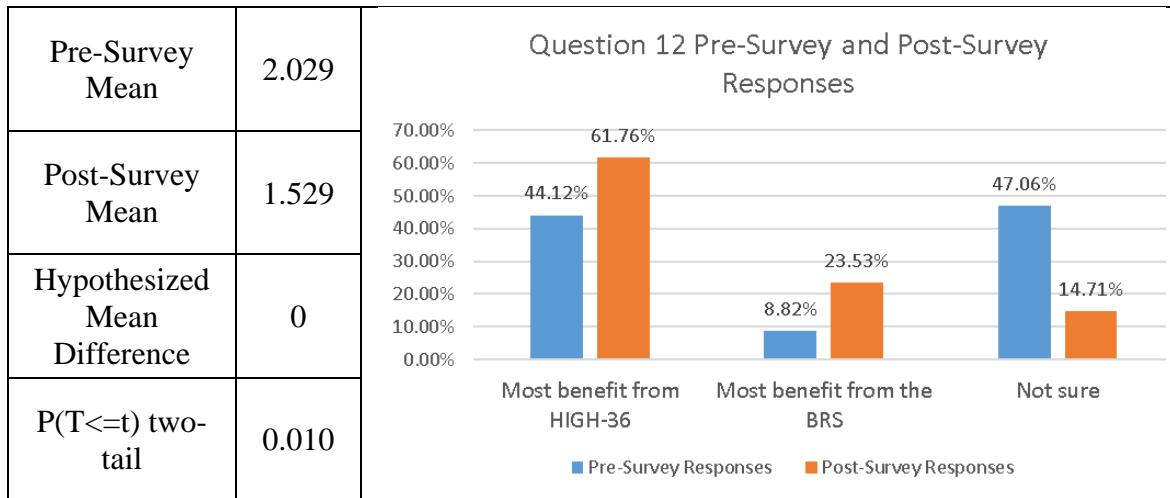
2. Data Organization

Question 12 within the pre-survey and the post-survey asked participants the following question: “Based on what you know now, which statement do you believe is true about the old retirement system and the new retirement system?” Participants were provided the following options: 1) I will get the most financial benefit from the old

retirement system, 2) I will get the most financial benefit from the new retirement system, and 3) I am not sure which retirement system gives me the most financial benefit. Changes in the responses of question 12 were analyzed using ANOVA after a RETIRE Tool intervention.

Table 9 displays the ANOVA analysis, the pre-survey responses, and the post-survey responses of survey question 12. Pre-survey responses are indicated with blue columns and post-survey responses are indicated with orange columns.

Table 9. Question 12 ANOVA Analysis, Pre-survey and Post-survey Responses



In the pre-survey, 47.06 percent of participants indicated he or she was “not sure” which retirement system gave him or her the most financial benefit. Additionally, 8.82 percent of participants indicated that the BRS provided the most financial benefit to him or her, and 44.12 percent indicated that HIGH-36 would provide them with the greatest financial benefit. In the post-survey, the percentage of participants indicating he or she was “not sure” was reduced from 47.06 percent to 14.71 percent. Participants that found the greatest financial benefit from the BRS increased to 23.53 percent, and participants finding the greatest financial benefit from HIGH-36 increased to 61.76 percent.

3. Analysis of Pre-survey and Post-survey Responses to Question 12

The observed change in question 12 from the pre-survey to the post-survey was found to be statistically significant, with an observed two-tail p-value of 0.010. This suggests that a RETIRE Tool intervention allowed participants to determine which retirement system will provide them the most financial benefit. This is most evident among pre-survey responses indicating “not sure.” A high percentage of the unsure population indicated that after using the RETIRE Tool they could identify the retirement system that provided him or her the most financial benefit.

I. ANALYSIS OF RETIRE TOOL FEATURES MOST INFLUENTIAL TO PARTICIPANTS

1. Discussion

For an analysis of RETIRE Tool features most influential to participants, a discussion of the participant's responses is presented in lieu of a hypothesis. While previous sections provided analysis through changes in the pre-survey and the post-survey responses, this section will provide descriptive analysis based on the following question: "which features of the RETIRE Tool are most influential to service members when deciding between the HIGH-36 retirement system and the Blended Retirement System?"

2. Data Organization

Participants were asked in post-survey questions 14, 15, and 16 to rank the top three features of the RETIRE Tool that he or she found most helpful. The options available were as follows: 1) Learning about my level of investment risk tolerance, 2) Learning about the benefits of the old retirement system (HIGH-36), 3) Learning about the benefits of the new retirement system (BRS), 4) The comparative cash flows chart showing the cash flows of the old retirement system and the new retirement system, 5) Total TSP Value Chart, 6) TSP Volatility, and 7) Net Present Value.

Figure 14 shows the post-survey responses to questions 14, 15, and 16. Question 14 asked participants to select the RETIRE Tool feature that was most helpful, question 15 asked for the second most helpful feature, and question 16 asked for the third most helpful feature. Question 14 responses are indicated by the blue portions of the columns. Question 15 responses are indicated by the orange portions of the columns, and question 16 responses are indicated by the gray portions of the columns.

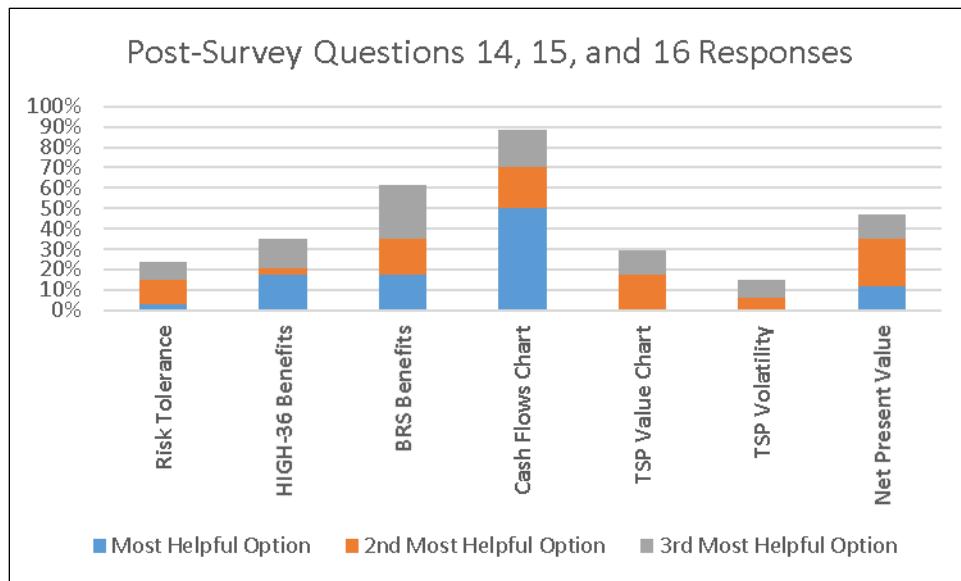


Figure 14. Post-survey Responses to Questions 14, 15, and 16

3. Analysis of Post-survey Questions 14, 15, and 16 Responses

The RETIRE Tool feature identified as the most helpful to the sample population was the comparative cash flow section of the RETIRE Tool. In total, 50 percent of the participants indicated this feature as the most helpful. One area that the researcher presumed would be helpful was the NPV section. Given that NPV accounts for the participant's time preference of money over a time-horizon, the researcher designed the RETIRE Tool to show NPV as the final step of financial analysis. The low value of helpfulness that participants indicated regarding NPV suggests that the participants did not value NPV as highly as the researcher anticipated. This may also suggest that further education of service members is required to find value from NPV calculations. Two additional areas of low value to the participants were the TSP volatility chart and the TSP value chart. This suggests that participants may still gain financial awareness absent of some RETIRE Tool features.

J. ANALYSIS CONSIDERING WHAT MORE CAN HELP SERVICE MEMBERS GIVEN THE CHOICE BETWEEN HIGH-36 AND THE BRS

1. Discussion

Participant responses from question 13 in the post-survey indicated that after using the RETIRE Tool, 26.47 percent of participant still felt unconfident in their decision between HIGH-36 and the BRS. This section presents evidence to answer the following question: “Is there anything else that service members feel will help them to choose between the old retirement system and the new retirement system?”

2. Data Organization

The last question of the pre-survey (question 17) provided participants with an option to identify what he or she feels would help them to choose between HIGH-36 and the BRS. Question 17 provided a text field where participants could provide a written response. Of the 34 research participants, 23 participants chose to provide a response to question 17, indicating there was something additional that would help them in the choice between HIGH-36 and the BRS. Of the written comments, the researcher categorized 17 of the responses applicable to the RETIRE Tool, and the remaining six responses are categorized as “other training or education” that will assist the service member in choosing between HIGH-36 and the BRS.

The 17 participant recommendations for the RETIRE Tool were categorized by the researcher. The participant recommendations for the RETIRE Tool are summarized below. Full responses to question 17 are presented in Appendix B.

1. Chart: Three participants identified a chart that would assist them. The first chart recommendation is a chart that shows service members the monetary value of the percentage of TSP contribution. For example, if a service member elects 5 percent of contribution, this chart would show the actual dollar amount based on the current year pay charts. The second chart recommendation is a TSP fund comparison chart so participants can understand the differences between TSP funds (two participants made this recommendation). The third chart recommendation is a chart showing monthly cash flows using a projected inflation rate.
2. Explanation: Four participants responded that further explanation would assist them. One participant requested further explanation of the TSP

funds (similar to chart recommendation two), two participants requested explanation of the risks and rewards of serving for less than 20 years, and one participant requested to get an explanation of the formulas used in the RETIRE Tool.

3. Survivor Benefits: One participant requested a feature in the RETIRE Tool regarding survivor benefits. The participant wanted to learn more about the differences in the two systems given the death of the service member with a living spouse.
4. Reserve Transfer: One participant requested a feature in the RETIRE Tool regarding a transfer from active-duty to the reserves. The participant wanted to understand how TSP contributions work once a service member transfers to the reserves.
5. Split percentages between TSP accounts: Two participants requested a feature in the RETIRE Tool that would allow a portion of the TSP contribution to go into multiple TSP accounts (note: the researcher previously identified this as a desirable feature, however due to time constraints of the research this feature has not been implemented yet).
6. TSP Contributions While Under HIGH-36: Four participants requested to see the potential value of TSP contributions while participating in the HIGH-36 (absent of matching contributions).
7. Previous Investments: Five participants requested a way to include TSP or previous retirement investments into the tool. For participants who currently contribute to the TSP, some of these participants felt it would benefit them to see the impact of their previous TSP contributions coupled with the new BRS system. For participants who contribute to other retirement accounts, these participants felt it would benefit them to see the totality of their retirement plan captured within the RETIRE Tool.

Six participants provided responses to question 17 that were not directly related to the RETIRE Tool. The responses are summarized as follows:

1. Financial advice from retired service members who have experience with the TSP.
2. Assistance with financial concepts like compounding interest, inflation, and risk.
3. Examples of service members with similar characteristics or variables.
4. Identification of the discount rate that will be used for lump sum payments.

5. Education for service members about what will happen with previous TSP contributions (the participant was uncertain if his or her previous contributions would be matched).
6. Education about the investment options available to service members (the participant was not certain if TSP was his or her only investment option).

3. Analysis of Post-survey Responses to Question 17

Responses to question 17 of the post-survey provide evidence to support the claim that participants seek additional features within the RETIRE Tool and additional resources outside of the RETIRE Tool. These responses provide confirmation of the necessity for increased financial literacy within the DOD (DOD, 2016).

K. SUMMARY OF FINDINGS RELATED TO RESEARCH QUESTIONS

- (1) **Research question one: “What effect will the use of the Realistic Evaluation of Taxes, Interest, Risk, and Equity tool (RETIRE Tool) have on U.S. service members’ level of confidence when deciding between the HIGH-36 retirement system and the Blended Retirement System?”**

Research participants demonstrated an increase in levels of confidence as evidenced in survey responses one, three, five, six, seven, ten, 12, and 13. The sample population exhibited increased levels of confidence which provides evidence to support the hypothesis that using the RETIRE Tool will increase service members’ level of confidence given the choice between HIGH-36 and the BRS.

- (2) **Research question two: “Which features of the RETIRE Tool are most influential to service members when deciding between the HIGH-36 retirement system and the Blended Retirement System?”**

By order of influence, the comparative cash flow chart, the benefits of HIGH-36 section, the benefits of the BRS, and the NPV section of the RETIRE Tool were most influential to service members. Participants indicated that these features helped the most when deciding between HIGH-36 and the BRS.

(3) Research question three: “How can service members be assisted to make informed financial decisions related to their retirement?”

Among the 34 participants, 23 provided responses indicating what will assist them to decide between HIGH-36 and the BRS. The responses to post-survey question 17 included recommendations for additional RETIRE Tool features and additional resources outside of the RETIRE Tool. Examples of additional RETIRE Tool features included TSP fund comparisons and the ability to invest in multiple TSP accounts at the same time.

L. RECOMMENDATIONS BASED ON ANALYSIS

(1) Utilize financial professionals to assist service members

The post-survey responses of the research participants showed evidence of a need for clarification and interpretation of financial data provided in the RETIRE Tool. While some participants appeared to grasp the financial concepts presented in the RETIRE Tool without assistance, other participants indicated a need for additional assistance to understand these concepts. Therefore, the researcher recommends that if the Department of Defense (DOD) uses the RETIRE Tool, that service members are afforded the opportunity to interact with a financial professional while they use the tool.

(2) Sample a population of enlisted service members

As previously discussed, the research consisted of active-duty U.S. military officers at NPS. The researcher attempted to sample an enlisted population, however, this was not accomplished. Research should be conducted to determine if enlisted service members display the same characteristics identified in this research’s officer sample. Given that the enlisted population across the DOD is much larger than the officer population, it stands to reason that this population should be sampled and analyzed regarding the effectiveness of the RETIRE Tool.

(3) Consider the needs of service members when designing tools and training

Responses within post-survey questions 14, 15, 16, and 17 demonstrate that service members have ideas about what can assist them when choosing between HIGH-36 and the BRS. Incorporating research participant recommendations may allow for a larger percentage of service members feeling confident given the choice between HIGH-36 and the BRS.

(4) Provide transparency and explanation of calculations

Any tool that provides future estimated values of retirement benefits must be built on a set of assumptions. For service members to make an informed financial decision, they should be informed of the underlying assumptions of a financial value estimator. Understanding the assumptions will allow service members to better determine if the tool will assist them given the choice between HIGH-36 and the BRS.

M. SUMMARY

This chapter provided an introduction to the analysis and results of the research. An analysis of survey responses which served to answer the three research questions was presented in this chapter. This chapter concluded with a summary of findings related to the research questions and recommendations based on analysis. The next chapter discusses the research summary, conclusions, and areas for further study.

V. SUMMARY, CONCLUSIONS, AND AREAS FOR FURTHER STUDY

It is perhaps of value to take a step back from research and analysis to realize the complexity of the decision which many service members will face in the near future regarding retirement. The choice between HIGH-36 and the BRS can ultimately be looked at as a binary decision. The factors, evaluation, education, and value that service members consider to make the decision, however, is anything but binary. The United States Armed Forces consists of a diverse population that reflects many parts of the American society. It stands to reason that this population will not all approach this decision in exactly the same manner. The RETIRE Tool was developed with the goal of providing one potential resource among many that service members may use to make an informed financial decision.

Based on the responses of participants, there clearly exists a population of service members who are educated on the retirement change and a population of service members who are not yet educated on the retirement change. Effective financial education must be able to pass the test of interpretation by service members across the DOD. Participant feedback can help to ensure that service members are hearing the message as it was originally intended regarding the retirement change.

Helping service members make an informed financial decision regarding the choice between HIGH-36 and the BRS benefits both the service member and the DOD. Service member confidence and levels of financial knowledge are likely to be related when making the choice between the two retirement systems. The question still remains which methods of education will be most beneficial within the DOD.

A. CONCLUSION

Research from the RAND Corporation and the findings of the Retirement Modernization Commission set in motion the formulation of current military retirement reform. As the FY16 National Defense Authorization Act was signed into law, the DOD started on a path of program implementation through education and resource

development. At the time this research was completed, the DOD is starting a one-year period of opt-in education for all U.S. service members both active and reserve. After the 2018 opt-in period concludes, many current and future service members will require assistance with the management and financial knowledge that is inherent given a TSP retirement account.

The pre-survey, RETIRE Tool responses, and the post-survey all show evidence that the RETIRE Tool has a positive net effect on the confidence of service members given the choice between HIGH-36 and the BRS. Participants identified the current features in the RETIRE Tool that were most influential regarding the decision between the two retirement systems. Participants also identified features not currently in the RETIRE Tool which participants felt would also assist them with this decision. Finally, research participants were able to identify which methods of financial education would best assist them with the decision between HIGH-36 and the BRS.

B. AREAS FOR FURTHER STUDY

As previously mentioned, the research did not consider the impact of lump sum payments given that the discount rate has not yet been released by the DOD at the time of this research. The choice that service members make to take a lump sum payment in exchange for a decrease in future pension payments is an area which warrants further investigation.

Given that the tool was developed for active-duty service members, further research on the development of a tool for reserve service members is recommended. For service members considering careers split between active-duty and the reserves, it may be of value to understand how the decision between HIGH-36 and the BRS affects this population.

The phasing out of HIGH-36 and the subsequent shift to the BRS will potentially have impacts on recruiting and retention. Further research in this area is recommended to determine if the expected result is inherently negative or positive.

Some of the pre-survey and post-survey questions were not found to be statistically significant. Participants were asked in the pre-survey and the post-survey how long they plan to stay in the military, and almost no changes were observed. Further research could provide insight to evaluate how service members decide how long they plan to serve in the military.

While the RETIRE Tool provides a financial evaluation of risk, one area of risk which was not quantified was the risk of not reaching 20 YOS. Service members that remain under HIGH-36 and do not reach 20 YOS will not be eligible for retirement benefits. Service members who elect BRS will retain some retirement benefits, but they will not be eligible for a pension under HIGH-36 or the BRS. Qualitative or quantitative research in this category may provide further explanation of how best to evaluate this risk.

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APPENDIX A. RETIRE TOOL SCREENSHOTS

Basic Information Section and Summary of RETIRE Tool Values

Annual Rate of Return	Fund Selection	TSP Contribution	Traditional Pension	BRS Pension	BRS Annuity (After you turn 59.5)	Net Present Value Discount Rate	Net Present Value HIGH 36	Net Present Value Blended Retirement
6.55%	L FUND 2050	5.00%	\$23,214.35	\$18,571.48	\$15,554.36	8.02%	\$ 99,795.34	\$ 84,125.31



RETIRE TOOL
Realistic Evaluation
of
Taxes, Interest, Risk and Equity

Basic Information

What is your current rank?	E-4	How many total years will you serve on active duty?	20
What is your birthdate? Example: 03-May-1992	1-Jun-1997	What rank do you think you will achieve when you leave active duty?	E-7
What is your Armed Forces Active Duty Base Date (AFADBD)? Example: 05-Jun-2011	1-Jun-2015	What age do you expect to live until? (Life Expectancy in the U.S. is 78)	80

Investment Risk Tolerance Section of the RETIRE Tool

Investment Risk Tolerance

In general, how would your best friend describe you as a risk taker?	In terms of experience, how comfortable are you investing in stocks or stock mutual funds?
Willing to take risks after completing adequate research	Somewhat comfortable
You are on a TV game show and can choose one of the following. Which would you take?	When you think of the word "risk" which of the following words comes to mind first?
A 50% chance at winning \$5,000	Opportunity
If you unexpectedly received \$20,000 to invest, what would you do?	Given the best- and worst-case returns of the four investment choices below, which would you prefer?
Invest it in safe high quality bonds or bond mutual funds	\$800 gain best case; \$200 loss worst case

Credit: <http://njaes.rutgers.edu:8080/money/riskquiz/>

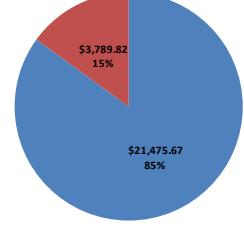
Personal Discount Rate Section of the RETIRE Tool

Personal Discount Rate		
<p>If you were offered \$10,000 in 40 years, what payment would make you indifferent to this choice if you received it today?</p> <p>I feel indifferent between <input style="width: 50px;" type="text" value="\$ 200.00"/> today and \$10,000 in 40 years</p>	<p>How much would you expect to receive in 40 years if you loaned \$10,000 to someone today?</p> <p>I feel indifferent between having \$10,000 today and having <input style="width: 50px;" type="text" value="\$65,000.00"/> in 40 years</p>	<p>What rate of return do you expect when you make investments?</p> <p>The rate of return I expect when I invest is: <input style="width: 50px;" type="text" value="9.0%"/></p>

TSP Contribution Election Section of the RETIRE Tool

New Hybrid Retirement System		
<p>Under the Blended Retirement System, the Department of Defense will provide an automatic contribution to the Thrift Savings Plan equal to 1% of your base pay. The Department of Defense will also match your Thrift Savings Plan contributions up to 5% of your base pay after 2 years of service.</p> <p>Blended Retirement System gives you the option to select a Thrift Savings Plan Fund. If you do not select a fund, Blended Retirement System will automatically enroll you in the L FUND 2050 with 3% contributions of your base pay. Based on your risk profile, you would also be suited for F Fund. Based on this information, what fund would you select and how much would you contribute to the Thrift Savings Plan?</p> <p>Select TSP Fund <input style="width: 150px;" type="text" value="L FUND 2050"/> Contribution of Base Pay <input style="width: 150px;" type="text" value="5.00%"/></p>	<p>If you pick the new Hybrid Retirement System, the contributions that you make to the Thrift Savings Plan will be available for withdrawal when you turn 59 1/2 years old. Based on your previous selection, your funds would be placed in the L FUND 2050 Thrift Savings Fund account. Some financial advisors recommend shifting your account into a lower risk investment.</p> <p>At this point, I will invest in <input style="width: 150px;" type="text" value="L FUND 2050"/> investments</p> <p>NOTE: Lifecycle Funds are designed to automatically decrease in risk over the life of the fund. If you intend to invest in the Lifecycle Funds, you would typically select the same fund for this question.</p>	

HIGH-36 Knowledge Section of the RETIRE Tool

How much money would I get per year in old retirement system (HIGH 36)?		 <p>How much federal tax will I pay on my retirement per year?</p> <p>Take home pay Federal tax payment</p> <p>NOTE: Under HIGH 36, you receive pension payments as soon as you retire, but you only get benefits if you serve beyond 20 years. If this section is blank it is because you plan to leave the military prior to 20 years.</p>
<p>How much will my annual retirement payment be under the old retirement system (HIGH 36) if I serve for 20 years?</p> <p>\$23,214.35</p> <p>How much will I receive per month?</p> <p>\$1,934.53</p> <p>Based on your entries, you will leave the military in 18.53 years. When you leave, you will be 38 years old. Based on your estimate of how long you will live, you will receive 42 years of retirement payments under the old retirement system (HIGH 36). After serving for 20 years of service, you are eligible for 50.00% of your base pay. Based on this, you will pay federal tax on your retirement at a rate of 15%.</p> <p>If you choose HIGH 36, and you live until you are 80, you will receive lifetime payments of:</p> <p><input style="width: 200px;" type="text" value="\$975,034.53"/></p>		

BRS Knowledge Section of the RETIRE Tool

How much money will I get per year in new hybrid retirement?

Under the new hybrid retirement, if you serve beyond 20 years, you will receive a pension equivalent to 2% of your base pay per year of service. After serving for **20** years, you will receive this much in pension payments per year:

\$18,571.48

How much will my pension payment be per month?

\$1,547.62

Under the new hybrid system, you will also receive benefits from the Thrift Savings Plan. You will be eligible to withdraw these benefits when you are 59 1/2 years old. Based on your previous response, you will invest in the **L FUND 2050** Thrift Savings Plan Funds. These funds are estimated to perform at an annual rate of **6.55%**.

What is the estimated value of my Thrift Savings Plan when I can start withdrawing funds at 59 1/2?

\$207,239.84

When you reach 59 1/2 years old, you will be able to start withdrawing your Thrift Savings Plan contributions. Based on your risk tolerance, you elected to place your funds in **L FUND 2050** investments after you turn 59 1/2. Historically, these funds perform at an annual rate of **6.55%**.

Based on when you expect to live, you will be able to make withdrawals from your Thrift Savings Plan for **20.50** years. Your annual withdrawal will be approximately:

\$15,554.36

If you choose the new hybrid retirement, and you live until you are **80**, you will receive lifetime payments of:

\$1,107,470.26

How much will I receive per year after I retire and before I turn 59 1/2?

Category	Value	Percentage
Take home pay	\$17,180.54	87%
Federal tax payment	\$2,577.08	13%

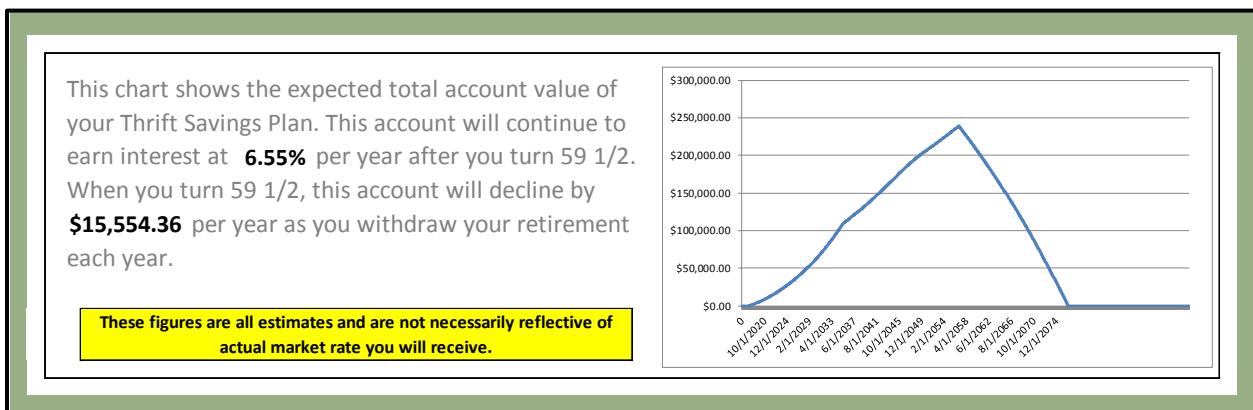
How much will I receive per year after I turn 59 1/2?

Category	Value	Percentage
Pension take home pay	\$17,180.54	49%
Federal tax payment	\$5,019.14	15%
TSP take home pay	\$12,656.01	36%

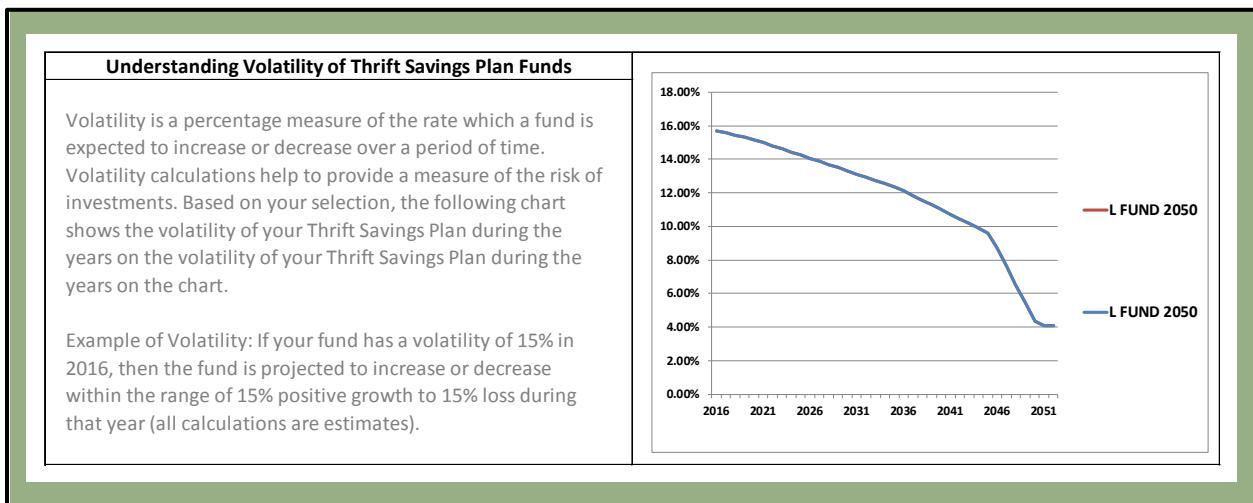
Comparative Cash Flow Chart within the RETIRE Tool



TSP Account Value Chart within the RETIRE Tool



TSP Volatility Chart within the RETIRE Tool



Net Present Value Section of the RETIRE Tool

Comparing the Net Present Value of HIGH 36 Compared to the Blended Retirement System	
<p>Net Present Value Definition: the value in the present of a sum of money, in contrast to some future value it will have when it has been invested at compound interest. Net present value allows you to compare future payments into "today's dollars."</p>	<p>Applied Discount Rate: 8.02%</p> <p><input type="checkbox"/> Apply Your Own Discount Rate:</p> <p>**Only recommended for service members with financial expertise**</p>
HIGH 36 Net Present Value (Old Retirement)	Blended Retirement System Net Present Value (New Retirement)
<p>\$ 99,795.34</p>	<p>\$ 84,125.31</p>

Comparison of Monthly Net Present Value of HIGH 36 and Blended Retirement System Payments	
<p>This chart shows the monthly Net Present Value of the payments you will receive in the HIGH 36 retirement system and the Blended Retirement System. Net Present Value Definition: the value in the present of a sum of money, in contrast to some future value it will have when it has been invested at compound interest. Net present value allows you to compare future payments into "today's dollars."</p> <p> █ HIGH 36 (OLD SYSTEM) CASH FLOWS █ BLENDED TSP (NEW SYSTEM) CASH FLOWS █ Member-elected TSP CONTRIBUTIONS </p>	<p>NPV OF LUMP SUM PAYMENT</p> <p>\$4,616.27</p> <p>6/1/2027</p>

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APPENDIX B. PRE-SURVEY AND POST-SURVEY RESPONSES

Pre-Survey PS1. Which answer best describes your choice between the current retirement system and the new retirement system?		
	Frequency	Percent
I am planning to choose the current retirement plan (HIGH 36 Retirement Plan)	16	47.06
I am planning to choose the new retirement plan (Blended Retirement Plan)	3	8.82
I am not sure which retirement plan to choose	15	44.12

Post-Survey PS1. Which answer best describes your choice between the current retirement system and the new retirement system?		
	Frequency	Percent
I am planning to choose the current retirement plan (HIGH 36 Retirement Plan)	19	55.88
I am planning to choose the new retirement plan (Blended Retirement Plan)	9	26.47
I am not sure which retirement plan to choose	6	17.65

Pre-Survey PS2. Do you currently contribute to the Thrift Savings Plan? (select the best answer)		
	Frequency	Percent
Yes	21	61.76
No, and I do not plan to contribute to the Thrift Savings Plan in the future	5	14.70
No, but I do plan to contribute to the Thrift Savings Plan in the future	4	11.76
No, but I am interested in learning more about the Thrift Savings Plan	4	11.76

Post-Survey PS2. Do you currently contribute to the Thrift Savings Plan? (select the best answer)		
	Frequency	Percent
Yes	21	61.76
No, and I do not plan to contribute to the Thrift Savings Plan in the future	7	20.59
No, but I do plan to contribute to the Thrift Savings Plan in the future	4	11.76
No, but I am interested in learning more about the Thrift Savings Plan	2	5.88

Pre-Survey PS3. Will your choice between the current retirement system and the new retirement system impact your decision to contribute to the Thrift Savings Plan?		
	Frequency	Percent
Yes	4	11.76
No	18	52.94
I am not sure	12	35.29

Post-Survey PS3. Will your choice between the current retirement system and the new retirement system impact your decision to contribute to the Thrift Savings Plan?		
	Frequency	Percent
Yes	11	32.35
No	20	58.82
I am not sure	3	8.82

Pre-Survey Only PS4. What level of experience do you have with investing in stocks and mutual funds-		
	Frequency	Percent
Little to no Experience	7	20.58
Some Experience	7	20.58
Average Level of Experience	12	35.29
Quite a bit of Experience	6	17.64
High Level of Experience	3	8.8

Pre-Survey PS5. Select the answer which best describes your level of knowledge of the following items: [Your knowledge of Net Present Value of Investments]		
	Frequency	Percent
Little to no Knowledge	11	32.35
Some Knowledge	2	5.88
Average Level of Knowledge	8	23.52
Quite a Bit of Knowledge	8	23.52
A High Level of Knowledge	5	14.70

Post-Survey PS5. Select the answer which best describes your level of knowledge of the following items: [Your knowledge of Net Present Value of Investments]		
	Frequency	Percent
Little to no Knowledge	3	8.82
Some Knowledge	9	26.47
Average Level of Knowledge	8	23.53
Quite a Bit of Knowledge	10	29.41
A High Level of Knowledge	4	11.76

Pre-Survey PS6. Select the answer that best describes how you feel about the following statement: [I feel confident about my knowledge level when choosing between the current retirement system and the new retirement system]

	Frequency	Percent
Strongly Disagree	5	14.70
Disagree	8	23.52
Neutral	10	29.41
Agree	9	26.47
Strongly Agree	2	5.88

Post-Survey PS6. Select the answer that best describes how you feel about the following statement: [I feel confident about my knowledge level when choosing between the current retirement system and the new retirement system]

	Frequency	Percent
Strongly Disagree	0	0
Disagree	3	8.82
Neutral	10	29.41
Agree	17	50.00
Strongly Agree	4	11.76

Pre-Survey PS7. Select the answer that best describes how you feel about the following statement: [I have enough information to make an informed financial decision when choosing between the current retirement system and the new retirement system]

	Frequency	Percent
Strongly Disagree	7	20.58
Disagree	8	23.52
Neutral	9	26.47
Agree	8	23.52
Strongly Agree	2	5.88

Post-Survey PS7. Select the answer that best describes how you feel about the following statement: [I have enough information to make an informed financial decision when choosing between the current retirement system and the new retirement system]

	Frequency	Percent
Strongly Disagree	0	0
Disagree	5	14.7
Neutral	7	20.58
Agree	14	41.17
Strongly Agree	8	23.52

Pre-Survey PS8. How many total years are you planning to stay in the military?		
	Frequency	Percent
0-4 Years	0	0
5-8 Years	2	5.88
9-12 Years	7	20.58
13-16 Years	1	2.94
17-20 Years	14	41.17
Over 20 Years	10	29.41

Post-Survey PS8. How many total years are you planning to stay in the military?		
	Frequency	Percent
0-4 Years	0	0
5-8 Years	2	5.88
9-12 Years	6	17.64
13-16 Years	0	0
17-20 Years	16	47.05
Over 20 Years	10	29.41

Pre-Survey PS9. How important are retirement benefits in your decision to stay in the military or leave the military-		
	Frequency	Percent
Not at all important	0	0
Slightly Important	3	8.82
Moderately Important	4	11.76
Very Important	14	41.17
Extremely Important	13	38.23

Post-Survey PS9. How important are retirement benefits in your decision to stay in the military or leave the military-		
	Frequency	Percent
Not at all important	0	0
Slightly Important	3	8.82
Moderately Important	4	11.76
Very Important	14	41.17
Extremely Important	13	38.23

Pre-Survey PS10. How confident are you in your decision between the current retirement system (HIGH 36) and the new retirement system (Blended Retirement System)?

	Frequency	Percent
I am really not confident	6	17.64
I am not confident	0	0
I am not sure	13	38.23
I am confident	11	32.35
I am really confident	4	11.76

Post-Survey PS10. How confident are you in your decision between the current retirement system (HIGH 36) and the new retirement system (Blended Retirement System)?

	Frequency	Percent
I am really not confident	1	2.94
I am not confident	2	5.88
I am not sure	7	20.58
I am confident	18	52.94
I am really confident	6	17.64

Pre-Survey PS11a. Select the highest category where you gained your knowledge and awareness of the current retirement system and the new retirement system:

	Frequency	Percent
My own research	20	58.82
Information from other service members	5	14.70
Military training	3	8.82
Family and friends	4	11.76
A financial professional	2	5.88

Post-Survey PS11a. Select the highest category where you gained your knowledge and awareness of the current retirement system and the new retirement system:

	Frequency	Percent
Today's class	6	17.64
Using the RETIRE Tool	16	47.05
My own research	8	23.52
Information from other service members	0	0
Military training	1	2.94
Family and friends	1	2.94
A financial professional	2	5.88

Pre-Survey PS11b. Select the second highest category where you gained your knowledge and awareness of the current retirement system and the new retirement system:

	Frequency	Percent
My own research	5	14.70
Information from other service members	14	41.17
Military training	7	20.58
Family and friends	4	11.76
A financial professional	2	5.88
Not Applicable	2	5.88

Post-Survey PS11b. Select the second highest category where you gained your knowledge and awareness of the current retirement system and the new retirement system:

	Frequency	Percent
Today's class	6	17.64
Using the RETIRE Tool	10	29.41
My own research	11	32.35
Information from other service members	3	8.82
Military training	1	2.94
Family and friends	2	5.88
A financial professional	1	2.94
Not Applicable	0	0

Pre-Survey PS11c. Select the third highest category where you gained your knowledge and awareness of the current retirement system and the new retirement system:

	Frequency	Percent
My own research	3	8.82
Information from other service members	8	23.52
Military training	7	20.58
Family and friends	4	11.76
A financial professional	1	2.94
Not Applicable	11	32.35

Post-Survey PS11c. Select the third highest category where you gained your knowledge and awareness of the current retirement system and the new retirement system:

	Frequency	Percent
Today's class	3	8.82
Using the RETIRE Tool	5	14.70
My own research	6	17.64
Information from other service members	13	38.23
Military training	3	8.82
Family and friends	3	8.82
A financial professional	1	2.94
Not Applicable	0	0

Pre-Survey PS12. Based on what you know now, which statement do you believe is true about the old retirement system and the new retirement system?		
I will get the most financial benefit from the old retirement system.	Frequency 15	Percent 44.12
I will get the most financial benefit from the new retirement system.	3	8.82
I am not sure which retirement system gives me the most financial benefit.	16	47.06
Post-Survey PS12. Based on what you know now, which statement do you believe is true about the old retirement system and the new retirement system?		
I will get the most financial benefit from the old retirement system.	Frequency 21	Percent 61.76
I will get the most financial benefit from the new retirement system.	8	23.53
I am not sure which retirement system gives me the most financial benefit.	5	14.71

Pre-Survey PS13. Select “yes” if you feel this statement is true for you, and select “no” if you do not feel this statement is true for you: [I feel confident that I am prepared to choose between the old retirement system and the new retirement system, and I do not need additional training.]		
Yes	Frequency 11	Percent 32.35
No	23	67.65
Post-Survey PS13. Select “yes” if you feel this statement is true for you, and select “no” if you do not feel this statement is true for you: [I feel confident that I am prepared to choose between the old retirement system and the new retirement system, and I do not need additional training.]		
Yes	Frequency 25	Percent 73.53
No	9	26.47

Post-Survey Only PS13a. Select the highest option which you feel will prepare you the most for deciding which retirement program to choose?		
	Frequency	Percent
A class with a knowledgeable instructor to help me understand the differences between the old retirement system and the new retirement system.	9	26.47
A representative from my chain of command, who is not necessarily trained in financial management who will explain the differences between the old retirement system and the new retirement system.	0	0
A tool which allows me to estimate the financial value of the old retirement system compared to the new retirement system based on my individual circumstances.	18	52.94
Skip	7	20.58
Post-Survey Only PS13b. Select the second highest option which you feel will prepare you the most for deciding which retirement program to choose?		
	Frequency	Percent
A class with a knowledgeable instructor to help me understand the differences between the old retirement system and the new retirement system.	17	50.00
A representative from my chain of command, who is not necessarily trained in financial management who will explain the differences between the old retirement system and the new retirement system.	0	0
A tool which allows me to estimate the financial value of the old retirement system compared to the new retirement system based on my individual circumstances.	10	29.41
Skip	7	20.58
Post-Survey Only PS13c. Select the third highest option which you feel will prepare you the most for deciding which retirement program to choose?		
	Frequency	Percent
A class with a knowledgeable instructor to help me understand the differences between the old retirement system and the new retirement system.	0	0
A representative from my chain of command, who is not necessarily trained in financial management who will explain the differences between the old retirement system and the new retirement system.	20	58.82
A tool which allows me to estimate the financial value of the old retirement system compared to the new retirement system based on my individual circumstances.	1	2.94
Skip	13	38.23

Post-Survey Only PS14. Select the RETIRE Tool feature that was the MOST helpful to you:		
	Frequency	Percent
Investment Risk Tolerance	1	2.94
Benefits of HIGH-36	6	17.64
Benefits of BRS	6	17.64
Comparative Cash Flows Chart	17	50.00
Total TSP Value Chart	0	0
TSP Volatility	0	0
Net Present Value	4	11.76

Post-Survey Only PS15. Select the RETIRE Tool feature that was the SECOND MOST helpful to you:		
	Frequency	Percent
Investment Risk Tolerance	4	11.76
Benefits of HIGH-36	1	2.94
Benefits of BRS	6	17.64
Comparative Cash Flows Chart	7	20.58
Total TSP Value Chart	6	17.64
TSP Volatility	2	5.88
Net Present Value	8	23.52

Post-Survey Only PS16. Select the RETIRE Tool feature that was the THIRD MOST helpful to you:		
	Frequency	Percent
Investment Risk Tolerance	3	8.82
Benefits of HIGH-36	5	14.70
Benefits of BRS	9	26.47
Comparative Cash Flows Chart	6	17.64
Total TSP Value Chart	4	11.76
TSP Volatility	3	8.82
Net Present Value	4	11.76

Post-Survey Only PS17. Is there anything else that you feel will help you to choose between the old retirement system and the new retirement system-

Response 1. Solid financial advice from Service Members who have retired, and who have experience from investing in the TSP during their time in service.

Response 2. I can't find a yes or no answer to whether someone who has been contributing to TSP for several years before the Blended Plan would get back-matching funds -- I think the answer is no, and that is a shame because I've lost 6 years of matching, but ultimately it doesn't change my decision, it would just make me more happy with choosing the Blended Plan.

Response 3. It might be helpful to have a chart showing what 3.0% of your base pay actually is, so people can calculate how much they would truly want to invest (or felt they could afford to invest) in the Blended Retirement System. Not knowing off the top of my head what my Base Pay is, I am kind of shooting the dark as to whether I would really want to invest 3% versus 2% or otherwise.

Response 4. More explanation on what the different options for funds, like the F or LC2050, are.

Response 5. What helped me the most decide between the old retirement system and blended retirement system was a personal education on finance and retirement options. Understanding the basics (compounding interest, inflation, risk) are essential concepts that most people have to learn the hard way.

Response 6. The largest piece of the decision for me was understanding the differences in risk, as the Blended Retirement System shifts the a lot of the risk from the government to the investor in the form of assets under the TSP. Conveying that risk, the service member assumes, is essential because the underlying assumptions (TSP growth forecasts, inflation estimates) might not adhere to historical trends."

Response 7. A better tool where I could review the formulas used. The RETIRE excel tool did not have the international fund option. It was also not realistic because I keep a % of S, I, and C funds. Selecting 100% in one fund is very unlikely. It would be great if a tool could incorporate the current value of your TSP. The tool needs to take into account the 18K max contribution annually.

Response 8. Fund comparison chart would aid in the calculator.

Response 9. If the class or system could provide some examples of officers who are of my current age/experience and how various choices play out. I do not currently invest in TSP, but I once did and I still maintain the account (just not currently investing) this was not an option. This was a great tool and class. It has made me really want to go through and research this more for myself now. Thank you!

Response 10. TSP calculation for the old high 36 retirement system.

Response 11. It would be more helpful to show the HIGH 36 system with the same TSP contributions (both in negative cash flow and in future income) as I elected for the BRS. It should be clarified how the BRS TSP contributions should be viewed differently; but it is viable to consider that if I am willing to contribute 5% under BRS, I will probably do it under the HIGH 36 as well.

Post-Survey Only PS17. Is there anything else that you feel will help you to choose between the old retirement system and the new retirement system-

Response 12. While the tool has a great deal of helpful information, a lot of it appears to be raw data that is highly dependent on the assumptions input by the service member using the tool. I think that the results need to be accompanied by greater explanation of how these assumptions affect the outcomes, and how the outcomes change if the assumptions change. One specific item that confused me in the results was that the pie wedge for TSP benefits includes benefits not derived exclusively from the BRS, i.e. it includes interest on the principal that I have to contribute. I personally would have preferred to see only the TSP benefit derived from the government matching funds.

Response 13. An additional graph which shows how my current TSP investment will look when I retire under the HIGH 36 plan.

Response 14. What will the Discount Rate be for the lump sum option for BRS?

Response 15. Recommend a chart showing the monthly cash flows using a projected inflation rate of 3% per year.

Response 16. I think it would be a better indicator of future worth if the system took into account TSP and possible personal investments in addition to the other options. For example, I am using the traditional system, but I have TSP as well as personal investments so the ending values per the old retirement system calculation are not necessarily correct for me.

Response 17. Comparing past investments in addition to new investment cash flow. Given that I'm already contributing to an L 2050 Fund, I'd be interested to know what the return would be with the addition of the BRS.

Response 18. I would like if the tool took into account other financial investments I am already making, i.e. Roth IRA, Traditional IRA. I would also like more information on the rules, risks and rewards if I get out after 15 years. Obviously it's less money, but while I need to play around with the tool more, I'd also like someone to talk me through navigating that early retirement possibility with the BRS.

Response 19. It would be highly beneficial to show what happens if you don't make it to 20 years. This can be a major factor in the decision to stay in or get out, and can be seen as a risk because it is not guaranteed you will be able to stay in for 20 years (health, draw downs, etc.). Also I suggest putting in information about transferring to the reserves for a reserve component retirement, and still making TSP contributions.

Response 20. Are there differences between the two systems for spousal benefits when the SM passes away, how does \$ already invested in the TSP alter the calculations?

Response 21. Seeing the option of how my current TSP Allocations (40%C 40%S and 10% I funds) would alter the decision point to go with the H36 or BRS retirement package.

Response 22. I have been investing in my TSP for 11 years at 5%. I would like to have been able to input the current value to see if there was an affect.

Response 23. How does this compare to your own investing in Roth, Traditional IRA, stocks, etc.? Is it worth waiting until you're 60? Is there a third option here...investing on your own and reaping the rewards of your investments sooner? What if you're investing half of your earnings and not just 5%?

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APPENDIX C. CAPTURED INPUTS FROM RETIRE TOOL

RETIRE Tool Basic Information Responses					
Current Rank	Age	Current YOS	Total Expected YOS	Expected Future Rank	Life Expectancy
O-3	34	8.5	22	O-6	90
O-4	33	10.5	20	O-5	84
O-3	29	6.5	20	O-5	85
O-3	31	8.5	21	O-5	85
O-1	22	0.5	8	O-3	80
O-3E	34	10.2	20	O-4	85
O-3E	32	10.0	20	O-5	82
O-3	28	4.7	11	O-4	78
O-4	34	5.5	20	O-5	90
O-3	30	5.9	9	O-3	90
O-3	31	9.5	20	O-5	80
O-4	34	11.5	20	O-5	78
O-3	31	9.5	20	O-5	90
O-4	34	10.5	20	O-5	78
O-4	35	11.1	21	O-5	76
O-2	39	7.2	20	O-4	78
O-3	27	4.9	20	O-5	85
O-4	37	14.5	20	O-5	80
O-3	30	6.9	20	O-5	78
O-4	34	11.5	20	O-5	100
O-3	28	5.5	11	O-4	82
O-3	31	5.7	25	O-5	85
O-3	32	9.5	20	O-5	85
O-3	33	8.1	20	O-5	80
O-2	26	4.0	10	O-3	78
O-2	26	3.5	20	O-5	75
O-3	33	10.4	20	O-5	90
O-3	29	5.5	20	O-6	78
O-3	27	5.1	23	O-5	84
O-3E	32	11.6	20	O-4	94
O-3	38	11.1	20	O-4	75
O-4	32	10.8	21	O-5	78
O-3	34	10.5	20	O-5	92
O-3	27	4.5	10	O-4	80

RETIRE Tool Investment Risk Tolerance Question One. In general, how would your best friend describe you as a risk taker?		
	Frequency	Percent
A real gambler	0	0
Willing to take risks after completing adequate research	29	85.29
Cautious	5	14.70
A real risk avoider	0	0

Adapted from Grable & Lytton, 1999

RETIRE Tool Investment Risk Tolerance Question Two. You are on a TV game show and can choose one of the following. Which would you take?

	Frequency	Percent
\$1,000 in cash	5	14.70
A 50% chance at winning \$5,000	20	58.82
A 25% chance at winning \$10,000	6	17.64
A 5% chance at winning \$100,000	3	8.82

Adapted from Grable & Lytton, 1999

RETIRE Tool Investment Risk Tolerance Question Three. If you unexpectedly received \$20,000 to invest, what would you do?

	Frequency	Percent
Deposit it in a bank account or an insured CD	3	8.82
Invest it in safe high quality bonds or bond mutual funds	10	29.41
Invest it in stocks or stock mutual funds	21	61.76

Adapted from Grable & Lytton, 1999

RETIRE Tool Investment Risk Tolerance Question Four. In terms of experience, how comfortable are you investing in stocks or stock mutual funds?

	Frequency	Percent
Not at all comfortable	6	17.64
Somewhat comfortable	16	47.05
Very comfortable	12	35.29

Adapted from Grable & Lytton, 1999

RETIRE Tool Investment Risk Tolerance Question Five. When you think of the word “risk” which of the following words comes to mind first?

	Frequency	Percent
Loss	1	2.94
Uncertainty	24	70.58
Opportunity	9	26.47
Thrill	0	0

Adapted from Grable & Lytton, 1999

RETIRE Tool Investment Risk Tolerance Question Six. Given the best and worst case returns of the four investment choices below, which would you prefer?

	Frequency	Percent
\$200 gain best case; \$0 gain/loss worst case	1	2.94
\$800 gain best case; \$200 loss worst case	5	14.70
\$2,600 gain best case; \$800 loss worst case	25	73.52
\$4,800 gain best case; \$2,400 loss worst case	3	8.82

Adapted from Grable & Lytton, 1999

RETIRE Tool Personal Discount Rate Responses

PDR 1	PDR 2	PDR 3
\$10,000.00	\$35,000.00	13.50%
\$4,000.00	\$20,000.00	3.75%

\$100.00	\$100,000.00	6.00%
\$2,500.00	\$20,000.00	4.00%
\$2,000.00	\$40,000.00	4.00%
\$2,500.00	\$60,000.00	6.00%
\$2,680.00	\$37,334.56	5.00%
\$1,000.00	\$100,000.00	5.00%
\$5,000.00	\$40,000.00	3.00%
\$2,000.00	\$70,000.00	8.00%
\$6,400.00	\$13,212.91	7.50%
\$380.00	\$250,000.00	4.00%
\$700.00	\$144,000.00	10.00%
\$2,500.00	\$25,000.00	10.00%
\$1,500.00	\$67,776.36	8.00%
\$4,000.00	\$100,000.00	5.00%
\$250.00	\$150,000.00	8.00%
\$2,500.00	\$40,000.00	7.00%
\$22,199.17	\$56,965.29	2.75%
\$1,500.00	\$68,500.00	8.00%
\$650.00	\$100,000.00	8.00%
\$1,200.00	\$32,000.00	7.20%
\$2,000.00	\$22,000.00	5.00%
\$500.00	\$11,000.00	10.00%
\$8,000.00	\$30,000.00	5.00%
\$500.00	\$100,000.00	8.00%
\$2,000.00	\$45,000.00	6.00%
\$5,000.00	\$30,000.00	10.00%
\$1,500.00	\$87,200.00	7.00%
\$1,000.00	\$100,000.00	3.00%
\$5,000.00	\$10,000.00	5.00%
\$800.00	\$50,000.00	8.00%
\$1,842.49	\$54,274.33	7.00%
\$900.00	\$26,000.00	8.00%

RETIRE Tool TSP Election Responses. Initial TSP Account		
	Frequency	Percent
Lifecycle 2020	0	0
Lifecycle 2030	0	0
Lifecycle 2040	3	8.82
Lifecycle 2050	15	44.11
G Fund	1	2.94
F Fund	3	8.82
C Fund	6	17.64
S Fund	6	17.64
Lifecycle Income	0	0

RETIRE Tool TSP Election Responses. Retirement TSP Account.		
	Frequency	Percent
Lifecycle 2020	0	0
Lifecycle 2030	0	0
Lifecycle 2040	3	8.82
Lifecycle 2050	15	44.11
G Fund	7	20.58
F Fund	4	11.76
C Fund	4	11.76
S Fund	1	2.94
Lifecycle Income	0	0

RETIRE Tool TSP Election Responses. Percentage of Base Pay		
	Frequency	Percent
0%	0	0
1%	0	0
2%	1	2.94
3%	4	11.76
4%	0	0
5%	29	85.29

RETIRE Tool Net Present Value	
NPV HIGH-36	NPV BRS
\$1,434,951.92	\$2,189,447.49
\$959,456.10	\$818,155.41
\$167,655.23	\$136,189.90
\$820,506.27	\$722,575.55
\$-	\$24,103.22
\$416,666.25	\$379,374.42
\$612,188.74	\$575,431.60
\$-	\$41,306.46
\$761,781.64	\$991,151.45
\$-	\$21,746.17
\$880,639.43	\$873,927.46
\$233,041.86	\$194,820.01
\$221,204.39	\$206,439.34
\$447,311.57	\$471,283.98
\$324,822.88	\$325,384.27
\$256,199.07	\$236,656.78
\$165,533.95	\$134,454.39
\$588,106.18	\$485,817.48
\$688,193.45	\$961,485.97
\$377,748.65	\$339,183.41
\$-	\$1,530.66
\$370,872.50	\$314,067.67
\$667,175.23	\$594,738.02
\$320,868.35	\$313,449.11
\$-	\$90,360.85
\$200,188.87	\$175,878.90
\$509,926.95	\$459,838.65
\$523,388.60	\$484,105.41
\$347,534.89	\$358,771.78
\$406,791.03	\$357,391.44
\$775,085.23	\$750,925.23
\$341,934.50	\$297,864.01
\$422,162.06	\$412,054.52
\$-	\$153,971.62

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